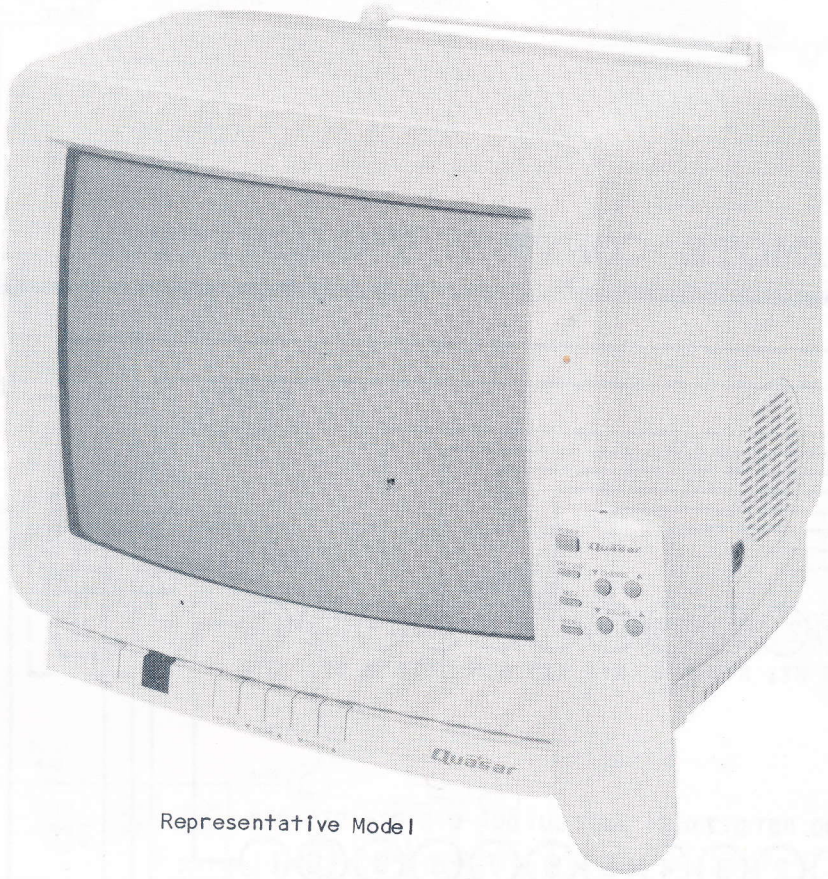
SAMS PHOTOFACT®

QUASAR
MODELS TP1020DE/DH/DR,YTP1120DE/DH

For Supplier Address See PHOTOFACT Index

QUASAR
MODELS TP1020DE/DH/DR,YTP1120DE/DH



Representative Model

QUASAR
MODELS TP1020DE/DH/DR,YTP1120DE/DH

SAFETY PRECAUTIONS

See Page 1

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SAMS™ Howard W. Sams & Co.
4300 West 62nd Street, P.O. Box 7092, Indianapolis, Indiana 46206 U.S.A.

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DATE 12-89 SET 2705 FOLDER 1

SET 2705 FOLDER 1

SAFETY PRECAUTIONS

SERVICE WARNING

Service work should be performed only by qualified service technicians who are familiar with safety checks and guide lines.

1. For continued safety, no modification of any circuit should be attempted unless recommended by manufacturer.

2. Disconnect power source before replacing parts as some parts may be electrostatic sensitive.

3. Use an isolation transformer between the line cord and power receptacle, when servicing chassis.

SERVICING HIGH VOLTAGE AND PICTURE TUBE

When servicing the High Voltage circuits, extreme caution should be used.

1. Discharge static High Voltage by connecting a 10 kohms resistor in series with a test lead between chassis and anode lead of picture tube.

2. Wear shatter-proof eye protection (goggles) when handling the picture tube in case of implosion.

3. DO NOT lift picture tube by the neck.

X-RAY RADIATION AND HIGH VOLTAGE LIMITS

Service personnel should be aware of the procedures and instructions covering x-ray radiation. The only potential source of x-ray in present day solid state receivers and monitors is the picture tube.

1. It is only when High Voltage is excessive that x-ray radiation is capable of being emitted from shell of picture tube. Be sure the High Voltage is set at specified level.

2. An accurate High Voltage meter should be available at all times. Meter calibration should be checked periodically.

3. High Voltage should be kept at rated value - NO HIGHER. Higher voltages may cause x-ray radiation or failure of other associated components. DO NOT depend on protection circuit to keep voltages at rated value.

4. Every time a chassis is serviced, High Voltage should be checked at various brightness levels to be sure it is regulating properly.

5. While troubleshooting a set with excessive High Voltage, avoid being close to picture tube. DO NOT operate longer than it is necessary to locate the cause of excessive High Voltage. Use a variable AC transformer to regulate voltage.

6. Many components, electrical and mechanical, in present chassis have safety related characteristics which are not evident with visual inspection. When these components are known, they are identified with a # on the schematic and in the parts list. When replacing these components, for SAFETY, use only an equivalent replacement part.

SAFETY CHECKS-FIRE AND SHOCK HAZARD

Cold Leakage Checks (Sets with isolated ground.)

1. Unplug the AC cord and connect a jumper across the two prongs on the plug.

2. Turn on power switch.

3. Measure the resistance, with an Ohm meter, between the jumpered AC plug and any exposed metal cabinet parts on the set such as: antenna screw heads, control shafts, handle brackets. Exposed metal parts that have a return path should measure between 200 kohms and 5 megohm. Parts without a return path must measure infinity.

Leakage Current Hot Check

1. Plug the AC cord directly into AC outlet. DO NOT use an isolation transformer.

2. Connect a 1500 Ohm 10 watt resistor, in parallel with a .15μF 150V AC capacitor, between any exposed metal parts on the set and a good earth ground such as a water pipe. (See Figure below.)

3. Using an AC volt meter, with 1000 Ohms per volt or more sensitivity, measure the voltage across the resistor. Check each exposed part and measure voltage at each point.

4. Reverse the AC plug and repeat voltage measurement at each point.

5. The voltage at any point should not exceed .75 volts RMS. This corresponds to .5 milliamps AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected.

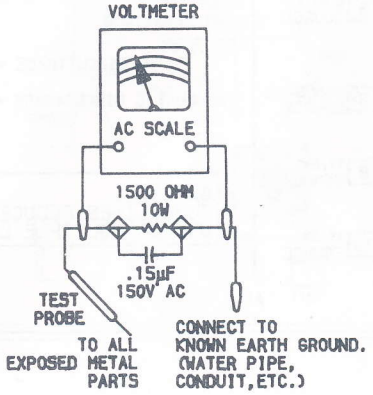
GENERAL GUIDE LINES

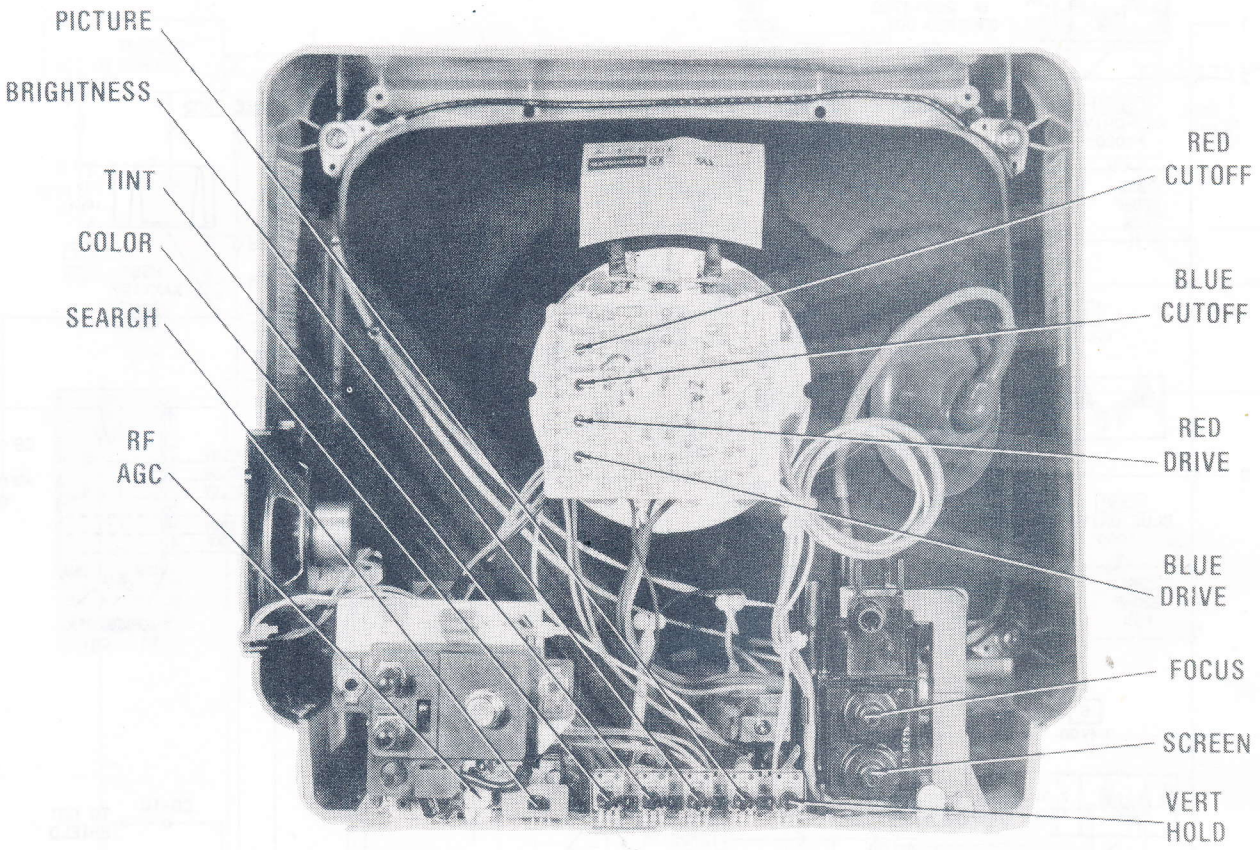
A final SAFETY check before returning the set to customer.

1. Check area repaired for poorly soldered or de-soldered connections. Check entire circuit board surface for solder splashes.

2. Check interboard wiring for pinched wires or wires contacting any high-wattage resistors.

3. Check that all control knobs, shields, covers, grounds and mounting hardware have been replaced. Be sure to replace all insulators.





CABINET–REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove six screws holding cabinet back and remove back. Disconnect HV anode, CRT socket, deflection yoke connectors, degaussing coil connector, speaker connectors, ground leads and all required cabling. Slide board assembly out of cabinet. CRT is accessible for removal at this point of disassembly. See CRT removal procedure.

CRT REMOVAL

Follow "Chassis Removal" procedure and lay set facedown on a soft protective surface. Loosen and remove CRT neck assemblies. Remove four screws holding CRT to cabinet front and lift CRT out of cabinet. DO NO LIFT CRT BY NECK.

SERVICING IN THE FIELD

CRT IMPLOSION PROTECTION AND CLEANING

Implosion protection is an integral part of the picture tube, cleaning accomplished without CRT removal.

FUSE DEVICES

A 3-amp fuse is used for low-voltage power supply protection.

CHANNEL TUNING

Channel Up and Down buttons are provided for channel scanning. Fine Tuning is automatic. See Channel pretuning instructions in Miscellaneous Adjustments.

HORIZONTAL OSCILLATOR

Adjustment of the horizontal hold is accomplished by the proper setting of the Horizontal Hold Control

FOCUS

The focus may be varied by a Focus Control. (See photo, Cabinet - Rear View.)

AGC

The AGC may be varied by an AGC Control. (See photo, Cabinet - Rear View.)

TROUBLESHOOTING AID

Note: Waveforms taken with triggered scope, Keyed-Rainbow generator. Schematic voltages measured with digital meter, no signal. Controls adjusted for normal operation.

PICTURE or SOUND

NO PIC, NO SOUND, NO RASTER: Check AC power supply and sources generated from Horizontal Output Transformer (T502). Refer to "Troubleshooting" Power Supply and Horizontal circuits.

NO PIC, NO SOUND, HAS RASTER: Check IF-AGC and source voltages from Horizontal Output Transformer (T502). Refer to "Troubleshooting" IF-AGC and Horizontal circuits.

NO PIC, HAS SOUND, NO RASTER: Check Horizontal Output Transformer (T502) sources and Video circuit. Refer to "Troubleshooting" Horizontal and Video circuits.

NO PIC, HAS SOUND, HAS RASTER: Refer to "Troubleshooting" Video circuit.

HAS PIC, NO SOUND: Refer to "Troubleshooting" Audio circuit.

OVERLOADED PICTURE: Refer to "Troubleshooting" IF-AGC circuit.

LOW OR EXCESSIVE BRIGHTNESS: Check Video and Luminance circuits. Refer to "Troubleshooting" Video circuit.

SWEEP

NO RASTER, HAS SOUND: Check HV rectifier, Part of Horizontal Output Transformer (T502). Refer to "Troubleshooting" Horizontal circuit.

NO RASTER, NO SOUND: Refer to "Troubleshooting" Horizontal circuit.

NO VERT DEFLECTION: Refer to "Troubleshooting" Vertical circuit.

POOR VERT LIN OR FOLDOVER: Refer to "Troubleshooting" Vertical circuit.

POOR HORIZ LIN OR FOLDOVER: Refer to "Troubleshooting" Horizontal circuit.

NARROW PICTURE: Refer to "Troubleshooting" Horizontal circuit.

VERT OFF FREQUENCY: Refer to "Troubleshooting" Vertical circuit.

HORIZ OFF FREQUENCY: Refer to "Troubleshooting" Horizontal circuit.

SYNC

NO VERT/HORIZ SYNC: Refer to "Troubleshooting" Sync circuit.

RASTER

YELLOW (NO BLUE): Check Chroma and Blue Output circuits. Refer to "Troubleshooting" Raster circuit.

CYAN (NO RED): Check Chroma and Red Output circuits. Refer to "Troubleshooting" Raster circuit.

MAGENTA (NO GREEN): Check Chroma and Green Output circuits. Refer to "Troubleshooting" Raster circuit.

COLOR (B/W operating normally)

NO COLOR: Refer to "Troubleshooting" Chroma circuit.

WEAK COLOR: Refer to "Troubleshooting" Chroma circuit.

NO COLOR SYNC: Refer to "Troubleshooting" Chroma circuit.

NO GREEN: Check Chroma and Green Output circuits. Refer to "Troubleshooting" Raster circuit.

NO BLUE: Check Chroma and Blue Output circuits. Refer to "Troubleshooting" Raster circuit.

NO RED: Check Chroma and Red Output circuits. Refer to "Troubleshooting" Raster circuit.

INCORRECT HUE (TINT): Refer to "Troubleshooting" Chroma circuit.

TROUBLESHOOTING

POWER SUPPLY

Check the AC Fuse (F801). If Fuse F801 is open, check Bridge Rectifier Diodes D801 thru D804, Thermistor D805, Capacitors C801 thru C803, C807 and C808, Electrolytic C805, and Horizontal Output Transistor Q502. Apply 120V AC, depress Power Switch and check for 157V at the cathode of Diode D801. If this voltage is missing, check Relay Drive Transistor Q831 and Power Relay RL831. If 157V is present at the cathode of Diode D801, check for 115V at TP93. If the voltage is missing, check voltages and components associated with Voltage Regulator IC (IC801) and Transistor Q502. If the proper voltage is present at TP93, refer to the "Horizontal" section of this Troubleshooting guide. If the voltage at TP93 is 143V, refer to the "Horizontal" and "High Voltage Shutdown" sections of this Troubleshooting guide.

HORIZONTAL

Determine if TV is in shutdown, refer to the "High Voltage Shutdown" section of this Troubleshooting guide. If TV is not in shutdown, inject a horizontal signal at the base of Horizontal Output Transistor (Q502). If horizontal deflection is now present, check voltages, waveforms and components associated with pins 1 thru 7 of Video/Sound IF/Chroma IC (IC101) and Horizontal Drive Transistor (Q501). If there is still no horizontal sweep, check the voltages, waveforms and components associated with Transistor Q502 and the Horizontal Output Transformer (T502). Check the voltages and components associated with Diodes D506, D507, and D401 for defects. The high voltage rectifier is part of Transformer T502 and if defective will affect the performance of the horizontal circuits. If the horizontal oscillator is off frequency, check the voltages, waveforms and components associated with pins 5, 6 and 7 of IC101. Horizontal linearity or foldover problems may be caused by Capacitors C507, C511, C518 and C519 being defective.

HIGH VOLTAGE SHUTDOWN

The high voltage is monitored by Diode D504, rectifying pulses from the Horizontal Output Transformer (T502). Should the high voltage increase, the rectified voltage at the cathode of Diode D504 will also increase and trigger Zener Diode D505 into conduction, shutting down the set. To troubleshoot, short pin 4 of Video/Sound IF/Chroma IC (IC101) to ground use a variable AC supply and check the voltage at TP93. If the voltage is greater than 115V troubleshoot the Power Supply. If the voltage at TP93 is less than 115V troubleshoot the Shutdown circuit. Remove short to ground from pin 4 of IC101.

NOTE: Care should be taken in defeating the high voltage shutdown circuit, as this may cause excessive X-radiation and damage to the CRT, Transformer T502 and associated components. Monitor the high voltage and troubleshoot.

Voltages Taken with TV in Shutdown

IC101	
Pin 4	.8V

HIGH VOLTAGE SHUTDOWN TEST

Apply 120V AC, turn set On, set all customer controls for normal operation and apply a variable 30V supply through an isolation diode to the cathode of Diode D504. Set should lose raster and sound. If set does not lose raster and sound the shutdown circuit should be repaired. To resume normal operation, remove AC Power and wait 30 seconds then turn set On.

IF-AGC

Inject a video IF signal at the IF input and check for video on the CRT. If video is present, check the Tuner, Tuner Control and Tuner AFC circuits. If there is no video on the CRT, check for a video waveform at TP12. If video is present at TP12, refer to the "Video" section of this Troubleshooting guide. If there is no video at TP12 apply AGC bias to pin 25 (TP14) of Video/Sound IF/Chroma IC (IC101). If video is now present at TP12, check voltages, waveforms and components associated with pins 24 and 25 of IC101. If there is still no video at TP12, check the voltages, waveforms and components associated with pins 14 thru 18 and 26 thru 29 of IC101 and IF Amp Transistor (Q101). A defective AGC circuit can cause an overloaded picture, excessive snow or loss of audio and video. See the AGC Voltage Chart for AGC voltages with signal.

AGC VOLTAGE CHART

IC101	
Pin 21	7.2V
Pin 24	5.5V
Pin 25	4.8V

AUDIO

Select an active TV channel and check for an audio waveform at pin 23 of Video/Sound IF/Chroma IC (IC101). If there is no audio, check the voltages, waveforms and components associated with pins 18, 19, 20, 22, and 23 of IC101. If audio is present at pin 23 of IC101, check for audio at pin 8 of Audio Output IC (IC201) with volume at Maximum. If there is no audio, check the voltages, waveforms and components associated with IC201. Check for .67V at mute and 11.9V at Maximum volume at pin 4 of IC201.

VIDEO

Inject a video signal at TP12 and check for video on the CRT. If video is present, refer to the "IF-AGC" section of this Troubleshooting guide. If there is no video on the CRT, check for a video waveform at pin 42 of Video/Sound IF/Chroma IC (IC101). If there is no video, check voltages, waveforms and components associated with pins 12, 30 thru 33 and 42 of IC101, Video Amp Transistors (Q301, Q303), pins 6,8,9,14 of Switch IC (IC003) and

pin 12 of IC101. If video is present at pin 42 of IC101 check voltages, waveforms and components associated with Video Output Transistor Q302, the CRT and Blue, Green, Red Output Transistor (Q351, Q353, Q352). If the brightness is inadequate or cannot be controlled, check the voltages, waveforms and components associated with pins 31 and 33 of IC101 and pin 8 of the CRT.

VERTICAL

Inject a vertical drive signal at pin 10 of Video/Sound IF/Chroma IC (IC101). If vertical deflection is now present, check the voltages, waveforms and components associated with pins 8, 9 and 10 of IC101. If there is still no vertical sweep, check the voltages, waveforms and components associated with the Vertical Output (IC402). Vertical linearity or fold-over problems may be caused by vertical feedback and bias circuits, check Electrolytics C409, C407, C414, C416 for defects.

SYNC

If there is no vertical or horizontal sync, check the voltages, waveforms and components associated with pin 17 of Video/Sound IF/Chroma IC (IC101). If there is no vertical sync, check the voltages, waveforms and components associated with pins 8, 9 and 10 of IC101. If there is no horizontal sync, check voltages and components associated with pins 5, 6 and 7 of IC101.

RASTER

Check the CRT and CRT voltages. If there is no Red, check the voltages and components associated with pin 41 of Video/Sound IF/Chroma IC (IC101) and Red Output Transistor (Q352). If there is no Green, check the voltages and components associated with pin 40 of IC101 and Green Output Transistor (Q353). If there is no Blue, check the voltages and components associated with pin 39 of IC101 and Blue Output Transistor (Q351). If raster has a keystone shape, check Deflection Yoke (L503). If raster has height or width problems, refer to the "Vertical", "Horizontal" and " Power" sections of this Troubleshooting guide.

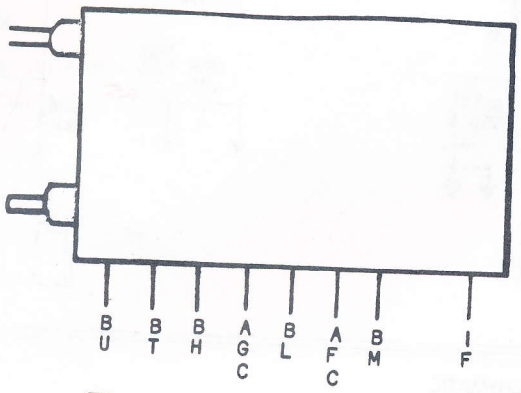
CHROMA

Check for a chroma waveform at pin 13 of Video/Sound IF/Chroma IC (IC101). If the waveform is missing, check the components associated with pin 13. If a chroma waveform is present at pin 13, check for the proper chroma waveforms at pins 39, 40 and 41 of IC101. If these waveforms are missing, check the voltages, waveforms and components associated with pins 11, 13 and 34 thru 41 of IC101. Check the 3.58MHz oscillator at pin 37 of IC101. Check the voltages and components associated with the Color Control and pin 34 of IC101. If there is inadequate tint range, check the voltages, waveforms and components associated with the Tint Control and pins 35 thru 38 of IC101. If the proper chroma waveforms are present at pins 39, 40 and 41 of IC101, refer to the "Raster" section of this Troubleshooting guide.

TUNER VOLTAGE CHART

	BMC	BL	AGC	BH	BT	BU	AFC
VHF Low Band	11.5V	11.4V	7.9V	0V	1.5V	0V	5.5V
VHF High Band	11.5V	0V	7.9V	11.4V	6.8V	0V	5.5V
UHF Band	11.5V	0V	7.9V	0V	2.5V	11.3V	5.5V

NOTE: VHF Low Band voltages taken on channel 2.
VHF High Band voltages taken on channel 7.
UHF Band voltages taken on channel 14.



TUNER TERMINAL GUIDE

TEST EQUIPMENT

Test Equipment listed by Manufacturer illustrates typical or equivalent equipment used by SAMS' Engineers to obtain measurements and is compatible with most types used by field service technicians.

Equipment	B & K Precision Equipment No.	Sencore Equipment No.	Notes
OSCILLOSCOPE	1560, 1564, 1541	SC61	
GENERATORS			
RGB	1249,1260		
MULTIBURST SIGNAL	1251,1260	VA62	
COLOR BAR	1211A,1249,1251,1260	VA62,CG25	
ANALOG VOM	277,111,116		
DIGITAL VOM	2830,2806	DVM37,DVM56,SC61	
FREQUENCY METER	1803,1805	FC71,SC61	
HI-VOLTAGE PROBE VOM/DMM Accessory probes	HV-44 PR-28(HV)	HP200	
ISOLATION TRANSFORMER	TR110,1604,1653,1655	PR57	
CAPACITANCE ANALYZER	820,810,830	LC53,LC75,LC76, LC77	
CRT ANALYZER	467,470	CR70	
TEMPERATURE PROBE	TP-28,TP-30		
AC LEAKAGE TESTER	1655	PR57	
LOGIC PROBE	DP51,DP21		
LOGIC PULSER	DP101,DP31		
INDUCTANCE ANALYZER	875	LC53,LC75,LC76, LC77	
FLYBACK YOKE TESTER	875	LC53,VA62	
TV STEREO GENERATOR	2009	ST65,ST66	
FIELD STRENGTH METER		FS73,FS74	

TV ALIGNMENT INSTRUCTIONS

Use an isolation transformer and observe power supply polarity. Maintain line voltage at 120V AC.
Allow a 20-minute warm-up period for receiver and test equipment.
Suggested Alignment Tools: GC-THORSEN
T101, T151, ...9440

PRELIMINARY INSTRUCTIONS

Set the channel selector to the highest unused channel. Set scope sweep to external. Connect scope vertical input to scope vertical input on sweep/marker generator. Connect scope external horizontal input to scope horizontal input on sweep/marker generator. Ground test equipment to TV chassis unless specified otherwise. Use only enough generator output to provide a usable indication.
Note: Response may vary slightly from that shown.

Connect a 4.5V Bias to TP14.

VIDEO IF ALIGNMENT (SWEEP MARKER GENERATOR)

DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
To TP 12	IF Output on Tuner	44MHz (10MHz Sweep)	45.75MHz	Adjust T101 for Maximum gain and Symmetry of response. See Figure 1.

SOUND IF ALIGNMENT

Tune in a station and adjust T202 for maximum sound. Reduce signal strength at the antenna terminals until distortion appears. Continue to reduce the signal while aligning for undistorted output by adjusting T202.

TV ALIGNMENT INSTRUCTIONS (Continued)

VIDEO IF ALIGNMENT (BAR SWEEP GENERATOR)

BAR SWEEP GENERATOR	SCOPE INPUT	REMARKS
TP15	TP12	Perform Video IF Adjustments per SWEEP/MARKER GENERATOR instructions above. See Figure 2.

SOUND IF ALIGNMENT

Tune in a station and adjust L602 for maximum sound. Reduce signal strength at the antenna terminals until distortion appears. Continue to reduce the signal while aligning for undistorted output by adjusting L602.

AUTOMATIC FINE TUNING ALIGNMENT

Connect as explained in preliminary instructions unless specified otherwise.

DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
TP18	TP15	44MHz (10MHz Sweep)	45.75MHz	Adjust L171 to place 45.75MHz as shown in Figure 3.

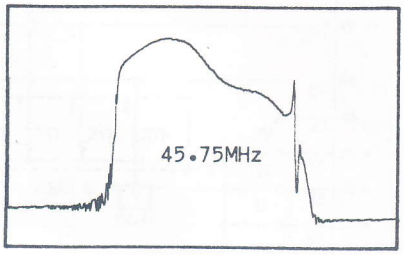


Figure 1

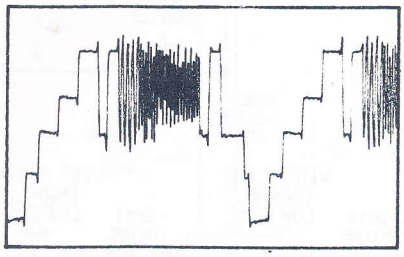


Figure 2

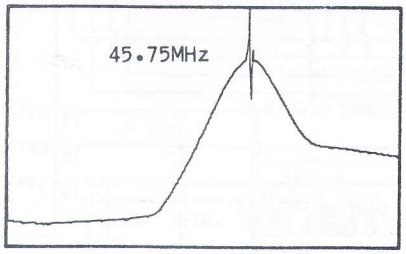
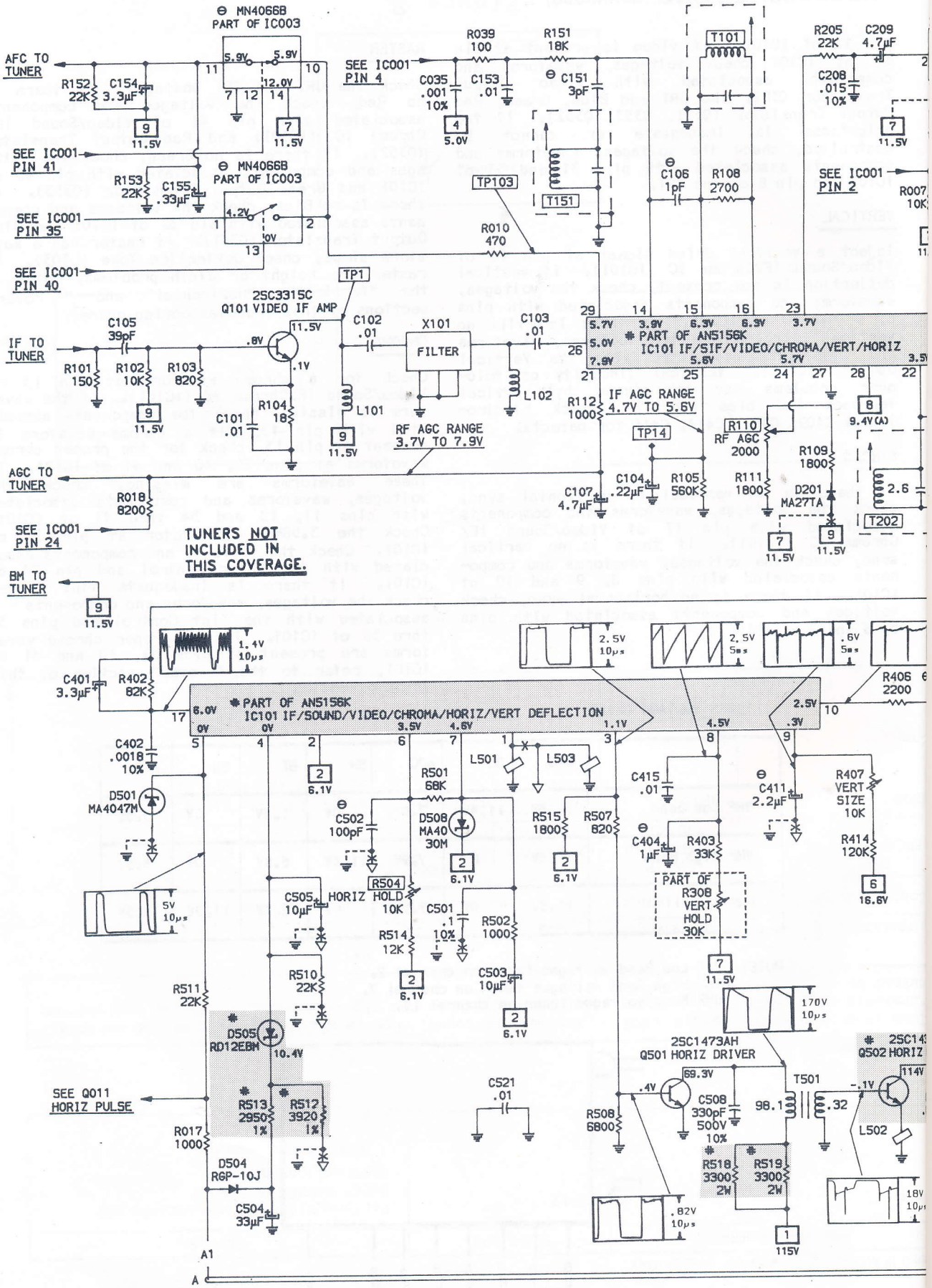


Figure 3



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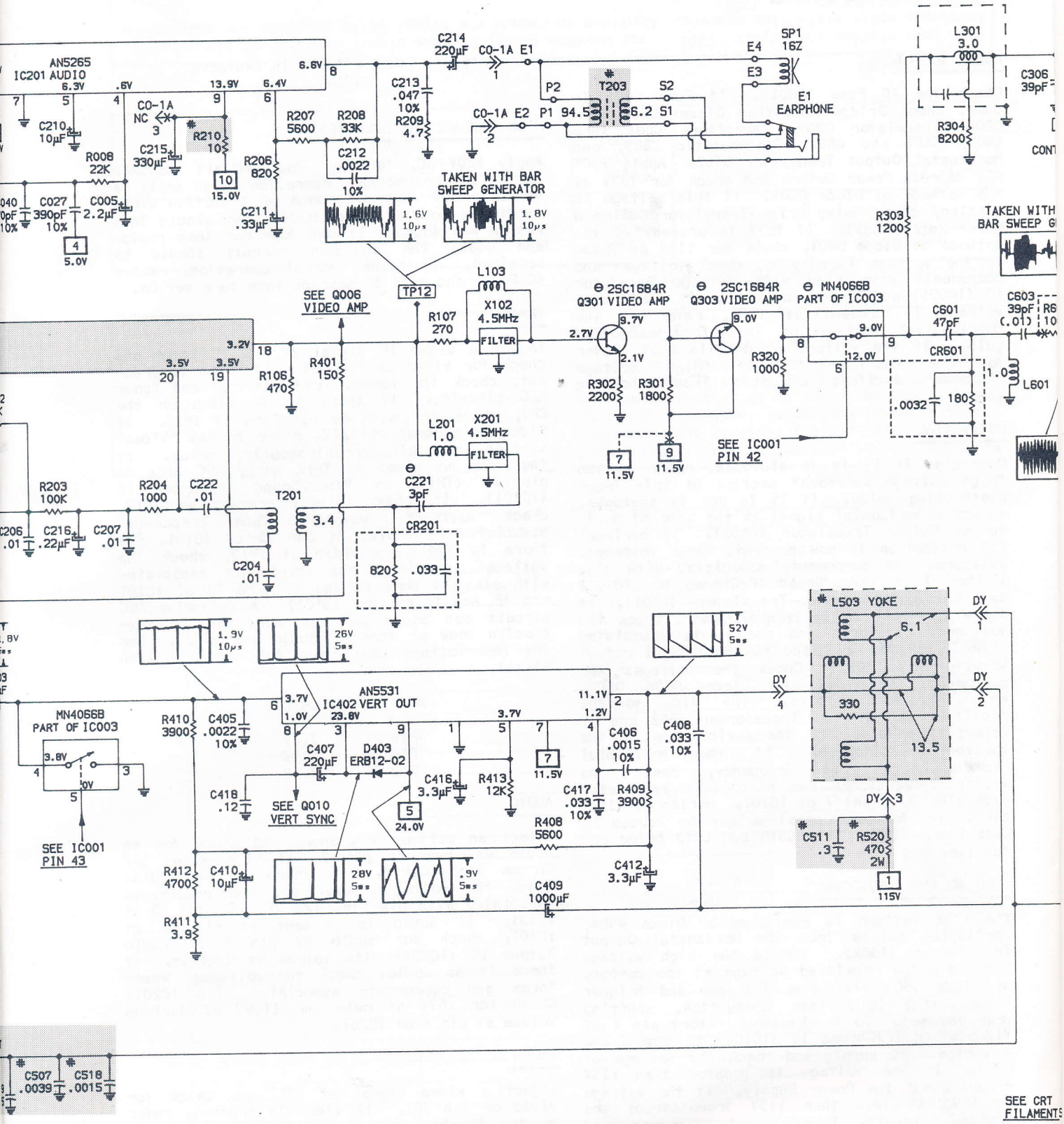
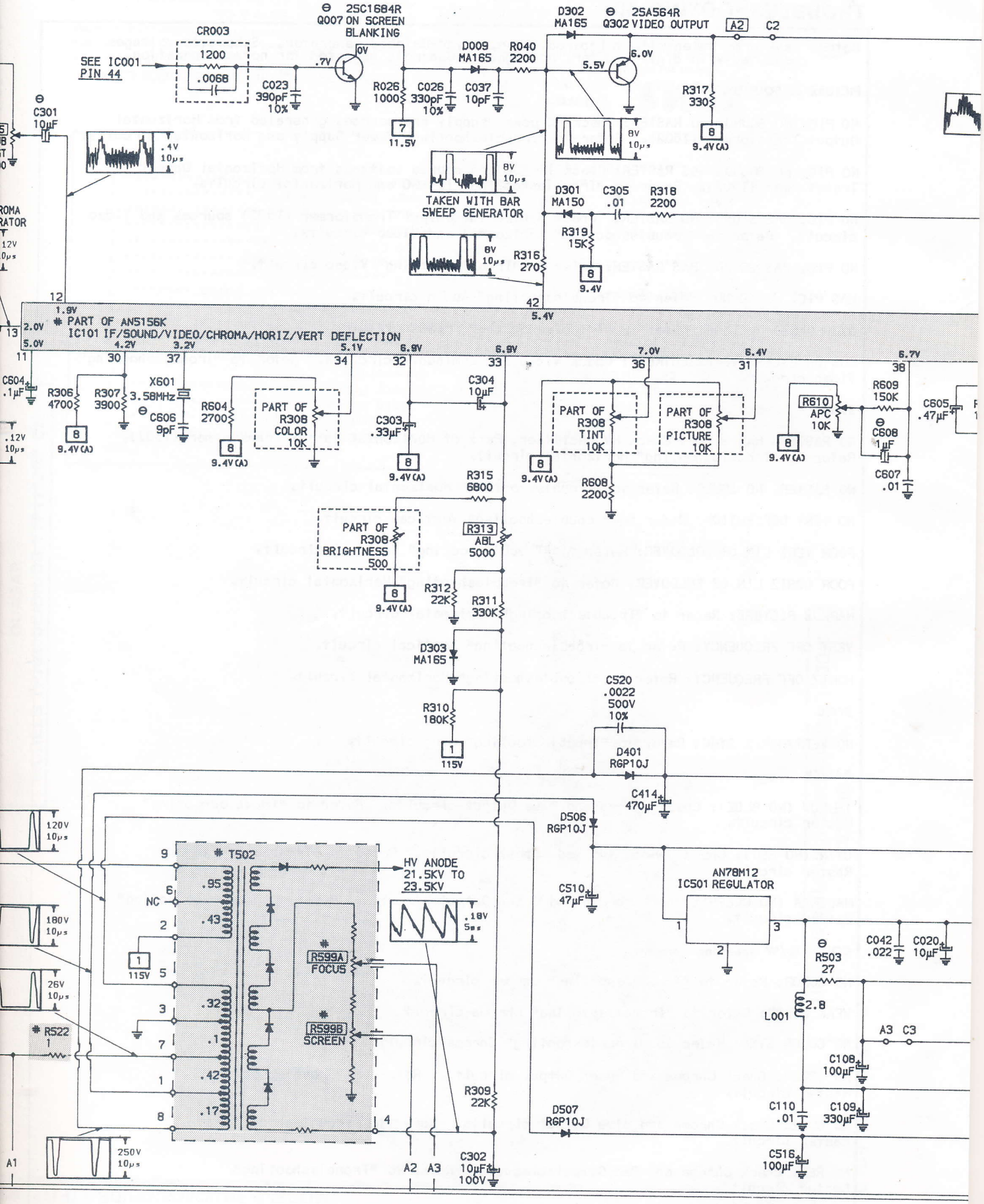
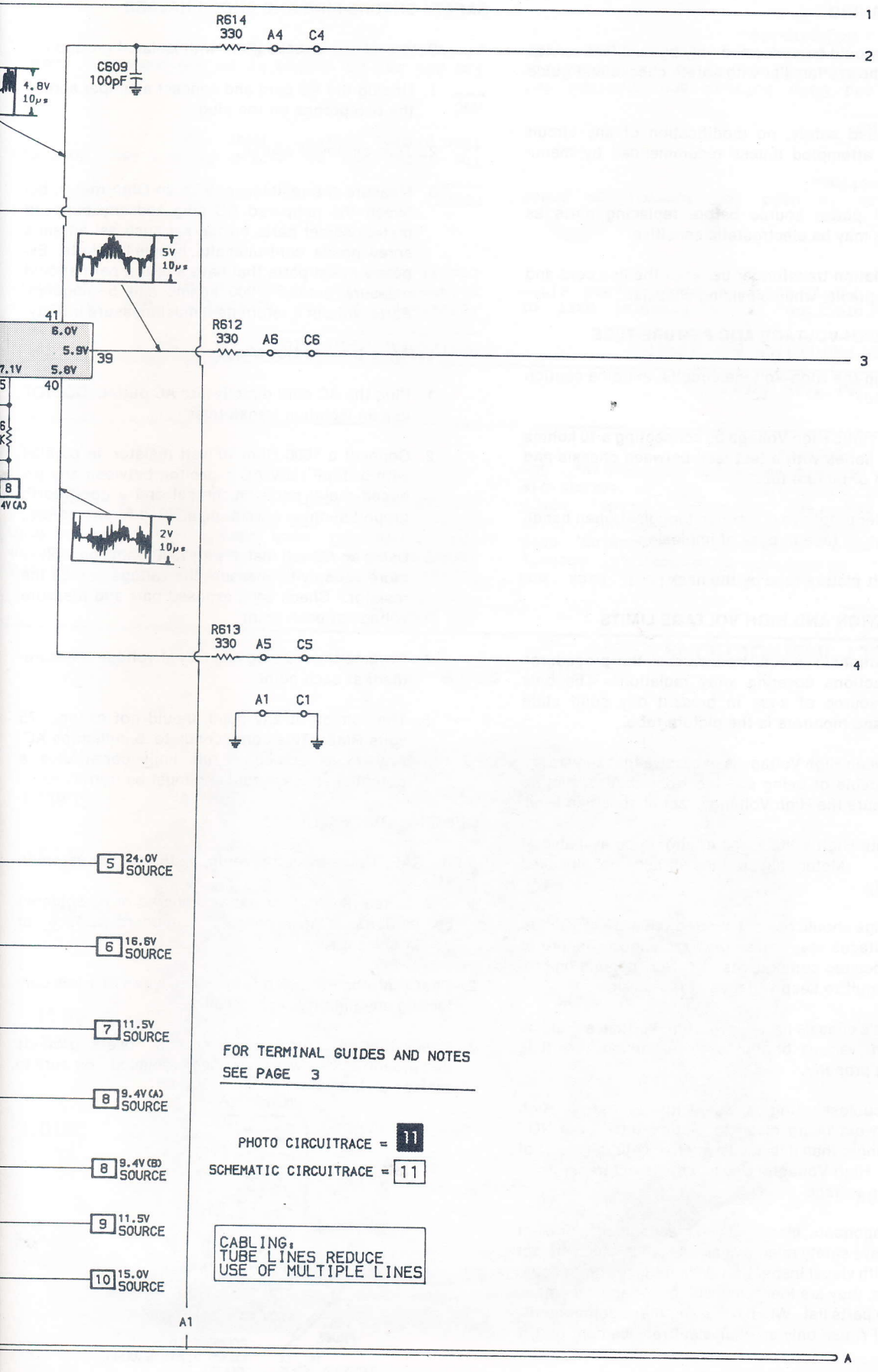

AN5265
IC201 AUDIO
C210 10µF
R008 22K
C027 390pF 10%
C005 2.2µF
C0-1A NC
R210 10
C215 330µF
R206 820
C211 .33µF
R207 5600
R208 33K
C212 .0022 10%
C213 .047 10%
R209 4.7
C214 220µF
C0-1A E1
C0-1A E2
P1 94.5
T203
P2
S2
S1
6.2
SP1 16Z
E4
E3
E1 EARPHONE
L301 3.0
C306 39pF
R304 8200
R303 1200
TAKEN WITH BAR SWEEP GENERATOR
TAKEN WITH BAR SWEEP G
TP12
L103
X102 4.5MHz
FILTER
R107 270
SEE Q006 VIDEO AMP
Q301 2SC1684R VIDEO AMP
Q303 2SC1684R VIDEO AMP
MN4066B PART OF IC003
R302 2200
R301 1800
R320 1000
C601 47pF
C603 39pF
CR601
.0032
180
1.0
L601
SEE IC001 PIN 42
R106 470
R401 150
L201 1.0
X201 4.5MHz
C221 3pF
R203 100K
R204 1000
C222 .01
T201
3.4
C206 .01
C216 .22µF
C207 .01
C204 .01
CR201
820
.033
L503 YOKE
6.1
330
13.5
DY
C511 .3
R520 470 2W
115V
AN5531
IC402 VERT OUT
MN4066B PART OF IC003
R410 3900
C405 .0022 10%
C407 220µF
D403 ERB12-02
C418 .12
SEE Q010 VERT SYNC
C416 3.3µF
R413 12K
C417 .033 10%
R409 3900
C406 .0015 10%
C408 .033 10%
R408 5600
C412 3.3µF
C409 1000µF
R412 4700
C410 10µF
R411 3.9
SEE IC001 PIN 43
C507 .0039
C518 .0015
SEE CRT FILAMENTS


CR003
1200
.0068
SEE IC001 PIN 44
C023 390pF 10%
Q007 2SC1684R ON SCREEN BLANKING
.7V
0V
R026 1000
C026 330pF 10%
C037 10pF
D009 MA165
R040 2200
D302 MA165
Q302 2SA564R VIDEO OUTPUT
A2
C2
5.5V
6.0V
R317 330
9.4V (A)
11.5V
C301 10µF
.4V 10µs
8V 10µs
TAKEN WITH BAR SWEEP GENERATOR
D301 MA150
C305 .01
R318 2200
R319 15K
R316 270
9.4V
5.4V
1.9V
2.0V
PART OF AN5156K
IC101 IF/SOUND/VIDEO/CHROMA/HORIZ/VERT DEFLECTION
5.0V
4.2V
3.2V
5.1V
6.9V
6.9V
7.0V
6.4V
6.7V
C604 .1µF
R306 4700
R307 3900
X601 3.58MHz
C606 9pF
9.4V (A)
R604 2700
PART OF R308 COLOR 10K
C303 .33µF
C304 10µF
PART OF R308 TINT 10K
PART OF R308 PICTURE 10K
R608 2200
R610 APC 10K
R609 150K
C608 1µF
C607 .01
C605 .47µF
R315 6800
PART OF R308 BRIGHTNESS 500
R313 ABL 5000
R312 22K
R311 330K
D303 MA165
R310 180K
115V
C520 .0022 500V 10%
D401 RGP10J
C414 470µF
D506 RGP10J
C510 47µF
AN78M12 IC501 REGULATOR
R503 27
C042 .022
C020 10µF
L001
2.8
A3
C3
C108 100µF
C110 .01
C109 330µF
C516 100µF
D507 RGP10J
R309 22K
C302 10µF 100V
A2
A3
A1
120V 10µs
180V 10µs
26V 10µs
250V 10µs
T502
HV ANODE 21.5KV TO 23.5KV
.18V 5µs
NC
.95
.43
.32
.1
.42
.17
R599A FOCUS
R599B SCREEN
R522 1

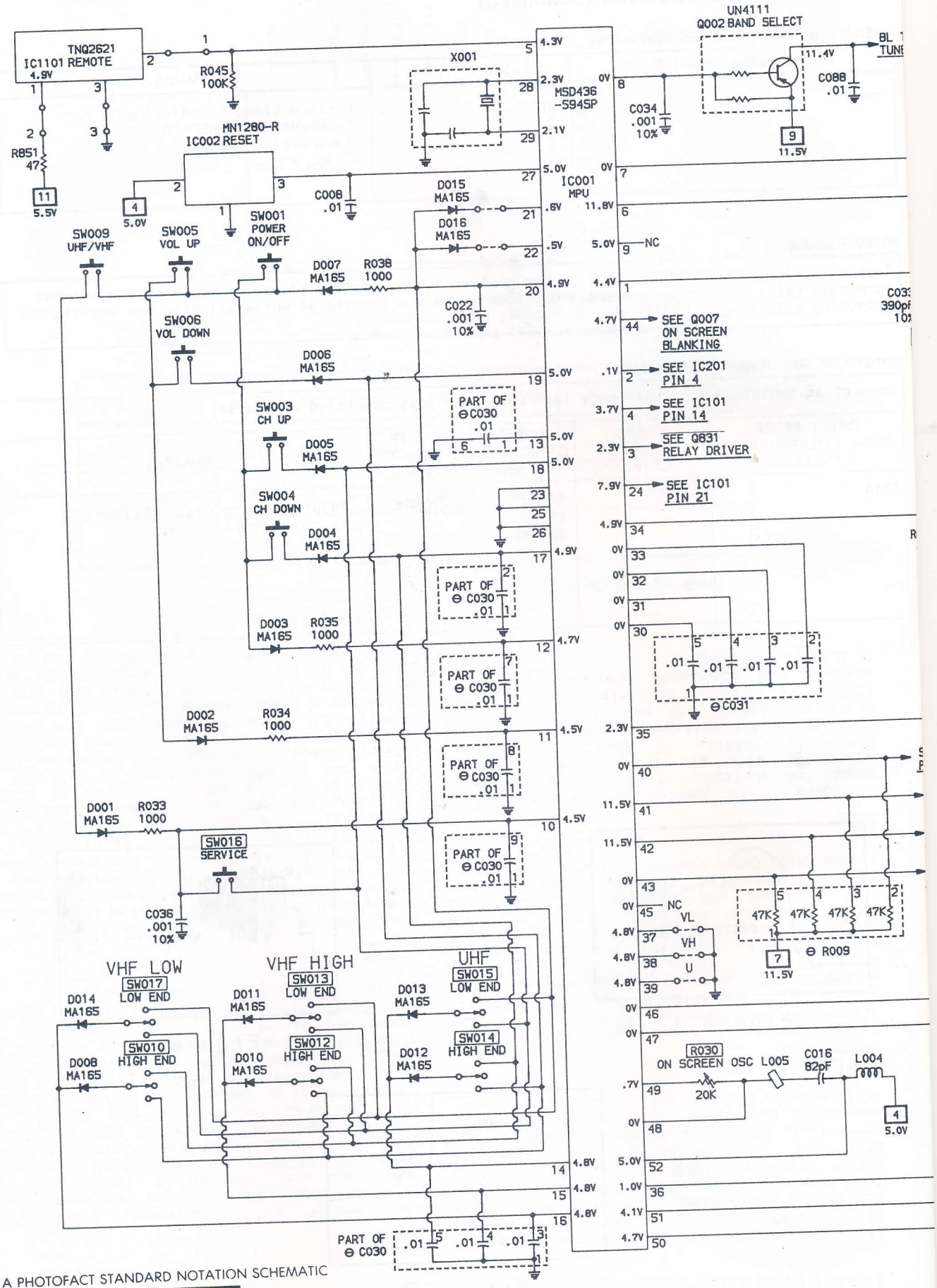


FOR TERMINAL GUIDES AND NOTES
SEE PAGE 3

PHOTO CIRCUITRACE = 11

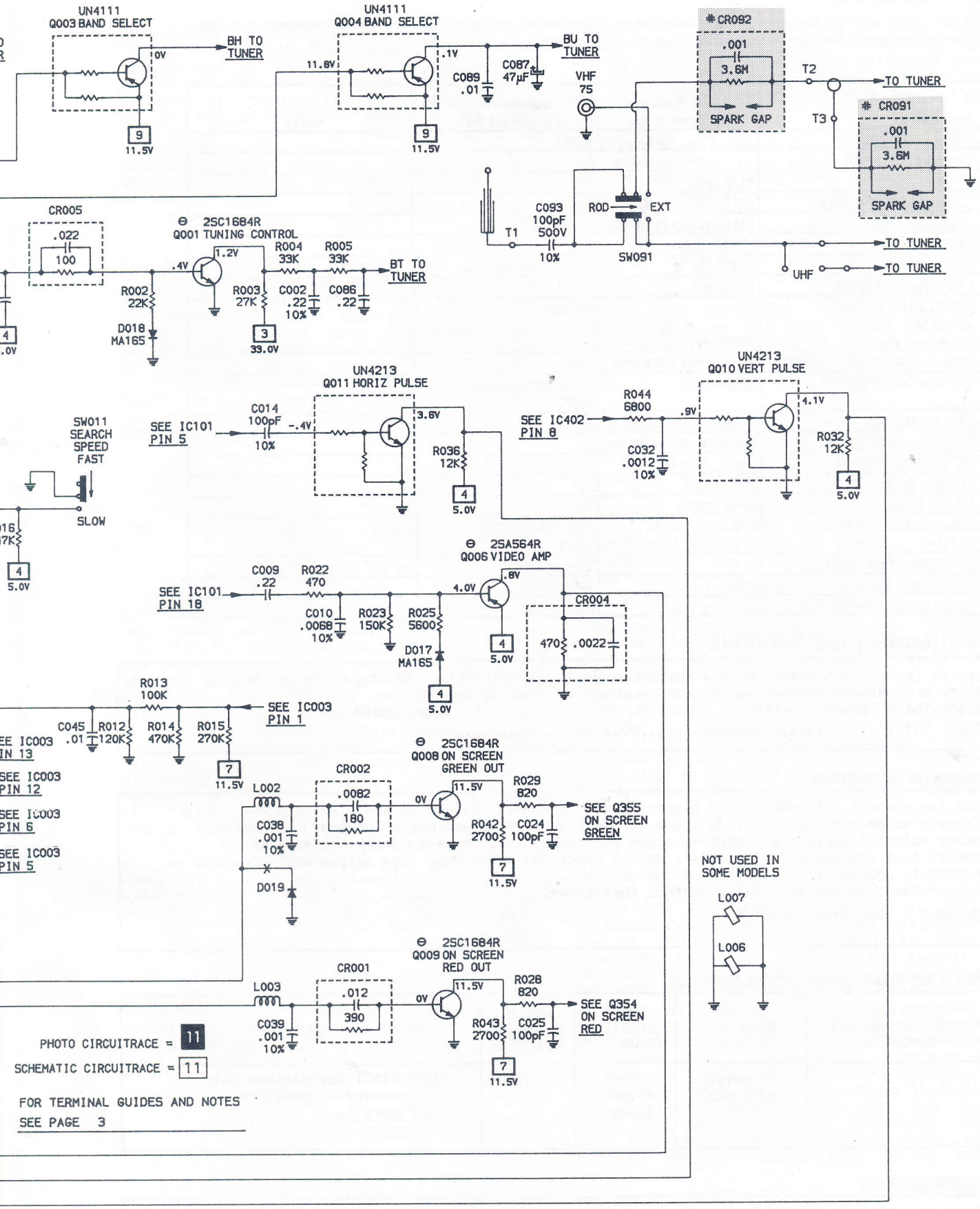
SCHEMATIC CIRCUITRACE = 11

CABLING:
TUBE LINES REDUCE
USE OF MULTIPLE LINES



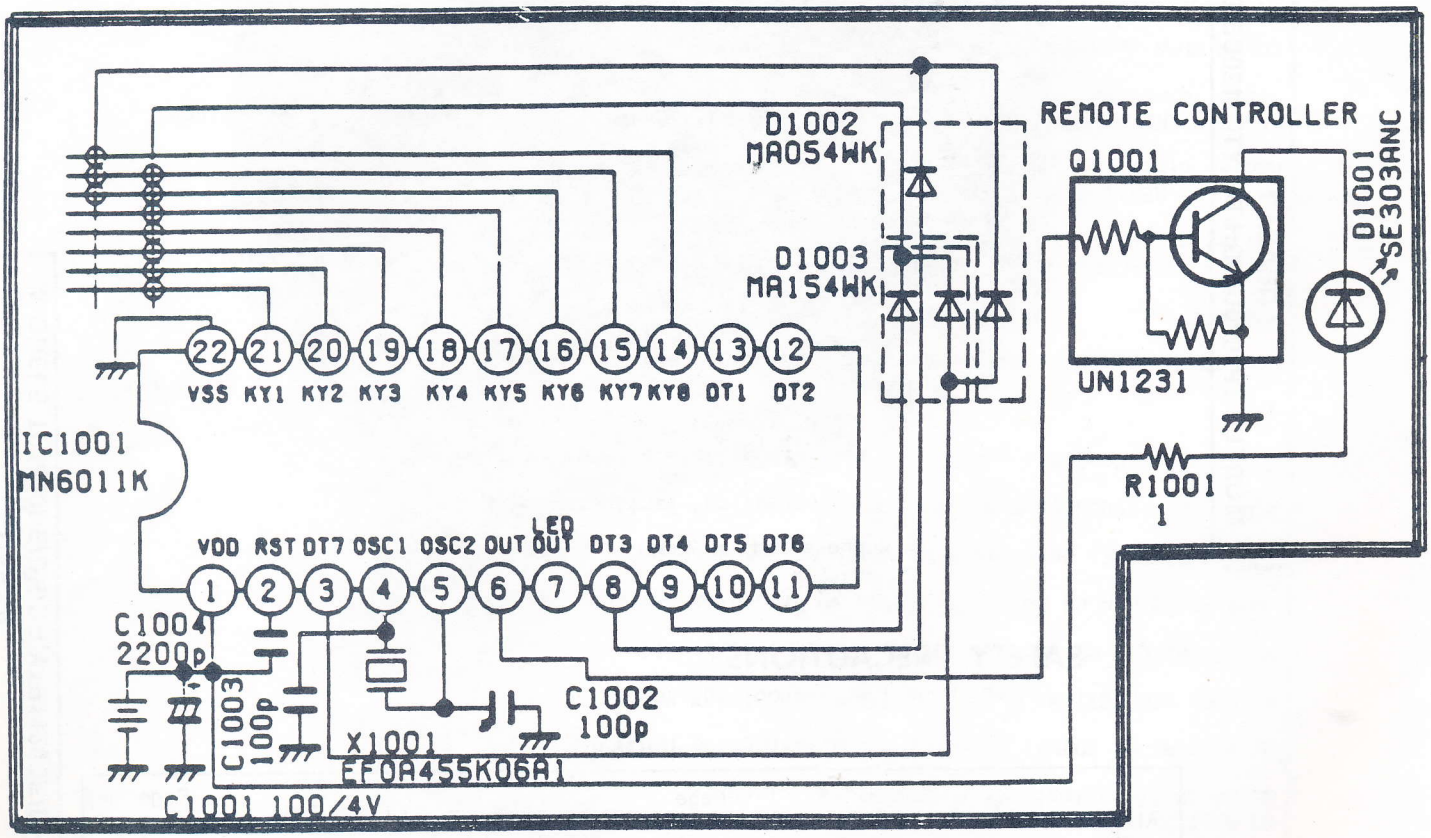
A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE®

© Howard W. Sams & Co., Inc. 1989

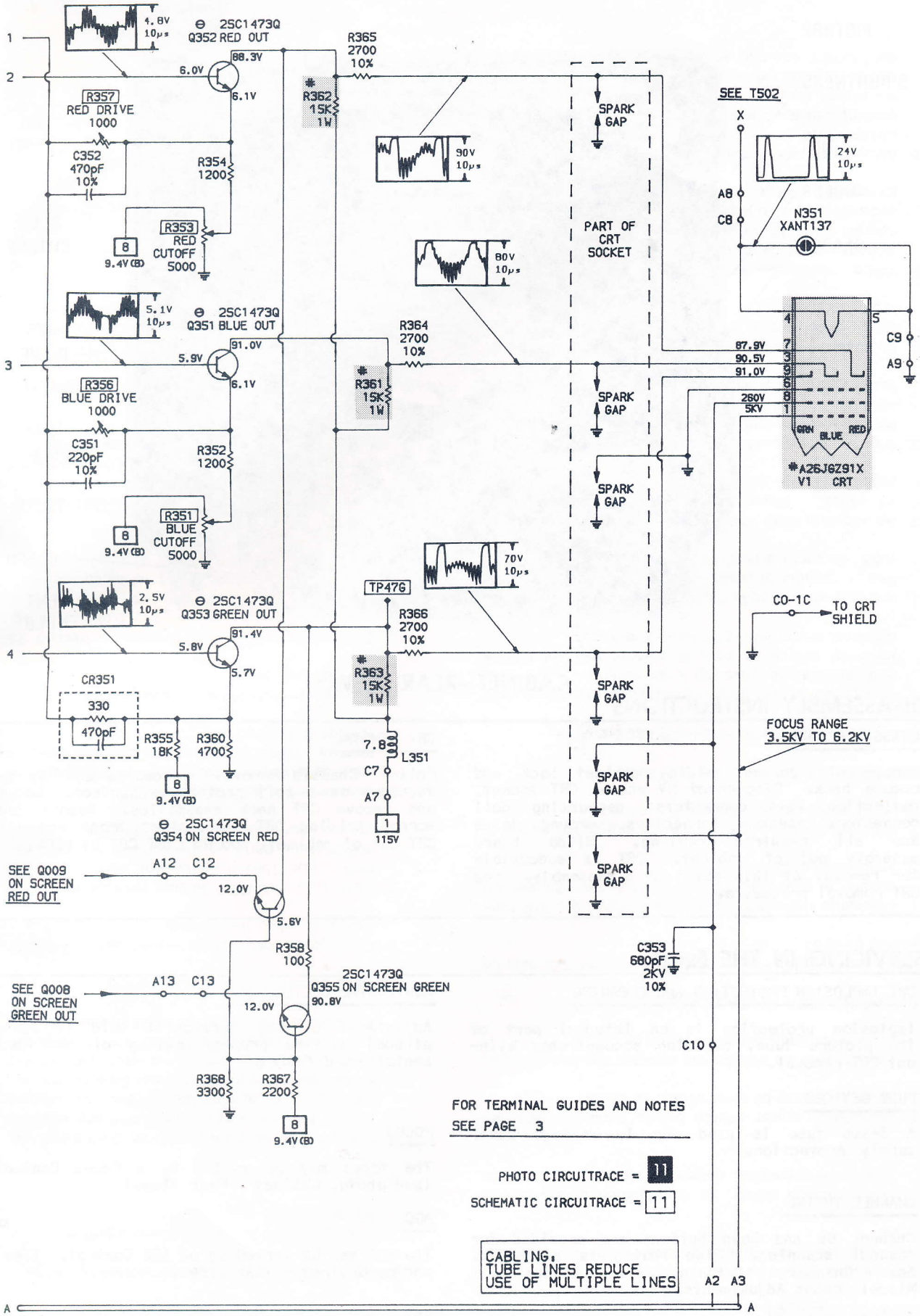


SELECTOR/TUNER CONTROL

REMOTE CONTROL TRANSMITTER



Courtesy of Manufacturer



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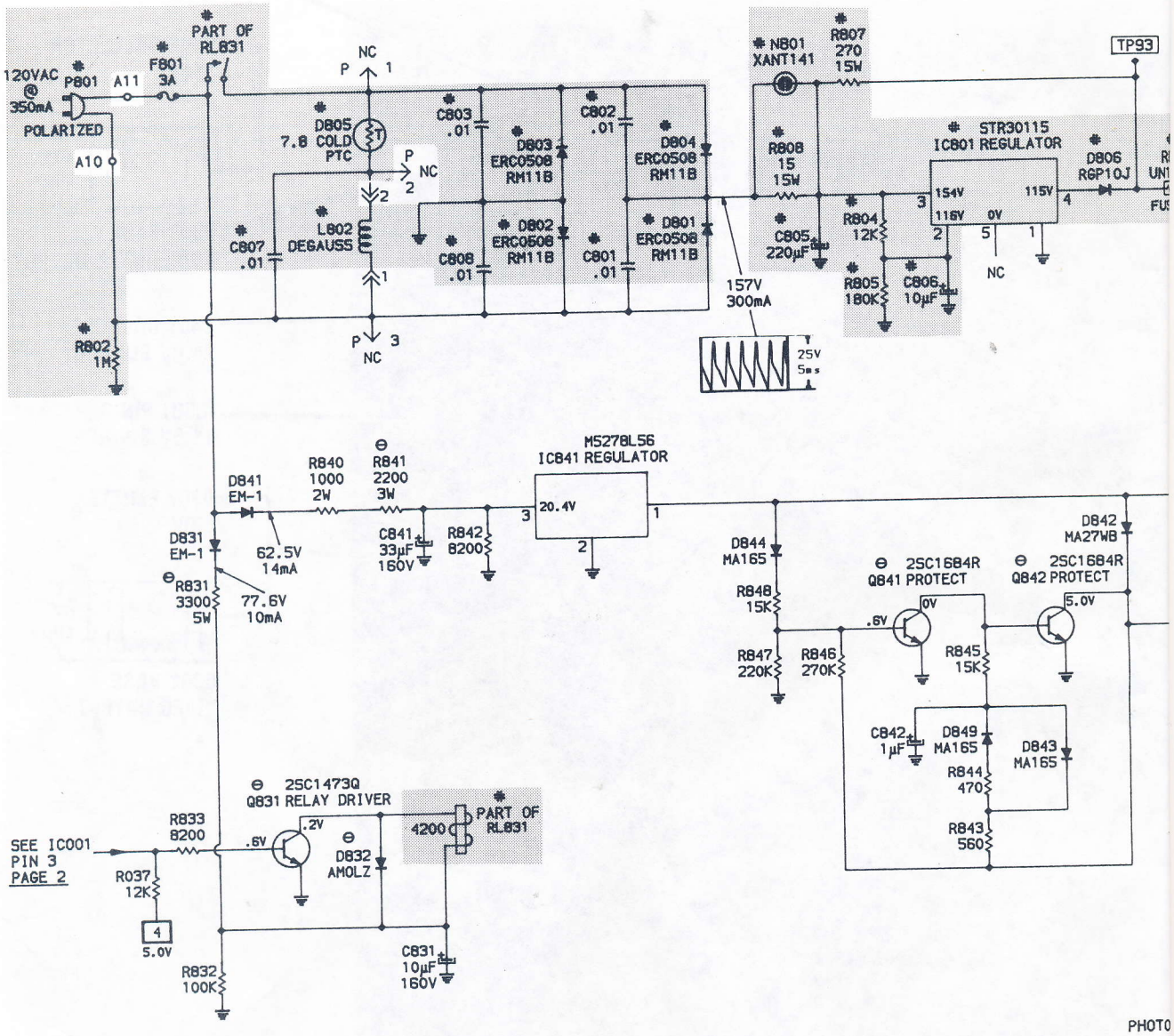
CRT



PHOTO

SCHEMATIC

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE®

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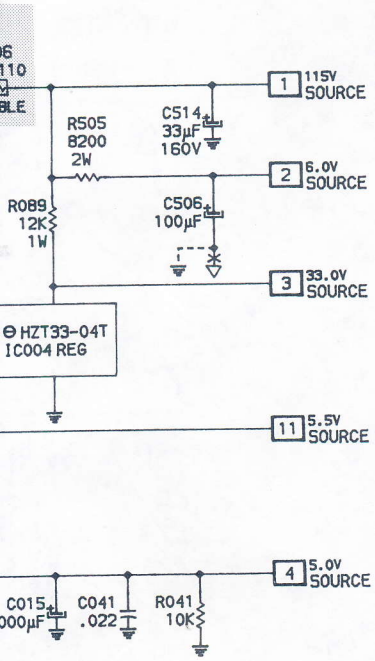
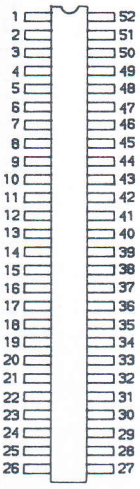
POWER SUPPLY



IRCUITRACE = 11

IRCUITRACE = 11

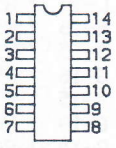
TERMINAL GUIDES AND NOTES



IC001
TOP VIEW

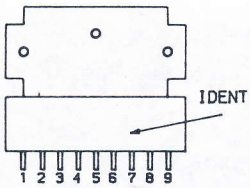
IC002
FRONT VIEW

IC004
HZT33

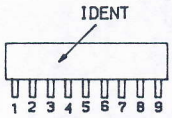


IC003
TOP VIEW

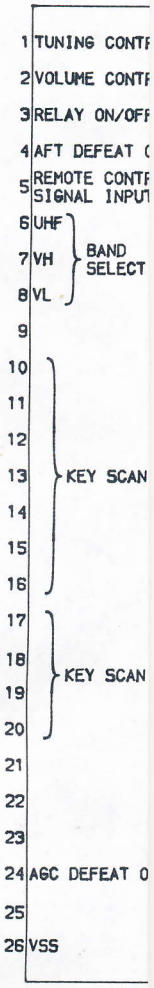
IC101
TOP VIEW



IC201
FRONT VIEW

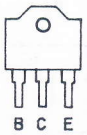


IC402
FRONT VIEW

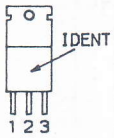


Q001
Q006 THRU Q009
Q301, Q302, Q303
Q351 THRU Q355
Q501
Q831, Q841, Q842
BOTTOM VIEW

Q002, Q003, Q004
Q010, Q011, Q101
FRONT VIEW

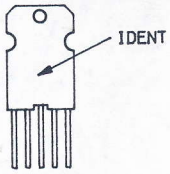


Q502
FRONT VIEW

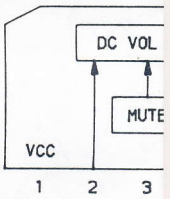


IC501
FRONT VIEW

IC841
BOTTOM VIEW



IC801
FRONT VIEW



 # For SAFETY use only equivalent replacement part, see parts list.

—✕— Circuitry not used in some versions

– – – Circuitry used in some versions

Θ See parts list

※ Nominal value

⏚ Ground

Chassis

▽ Common tie point

Waveforms and voltages are taken from ground, unless noted otherwise.

Waveforms: triggered scope, keyed rainbow generator.

Item numbers in rectangles appear in the alignment/adjustment instructions.

Supply voltages maintained as shown at input.

Voltages measured with digital meter, no signal.

Controls adjusted for normal operation.

Terminal identification may not be found on unit.

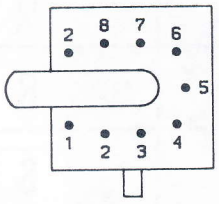
Capacitors are 50 volts or less, 5% unless noted.

Electrolytic capacitors are 50 volts or less, 20% unless noted.

Resistors are ½W or less, 5% unless noted.

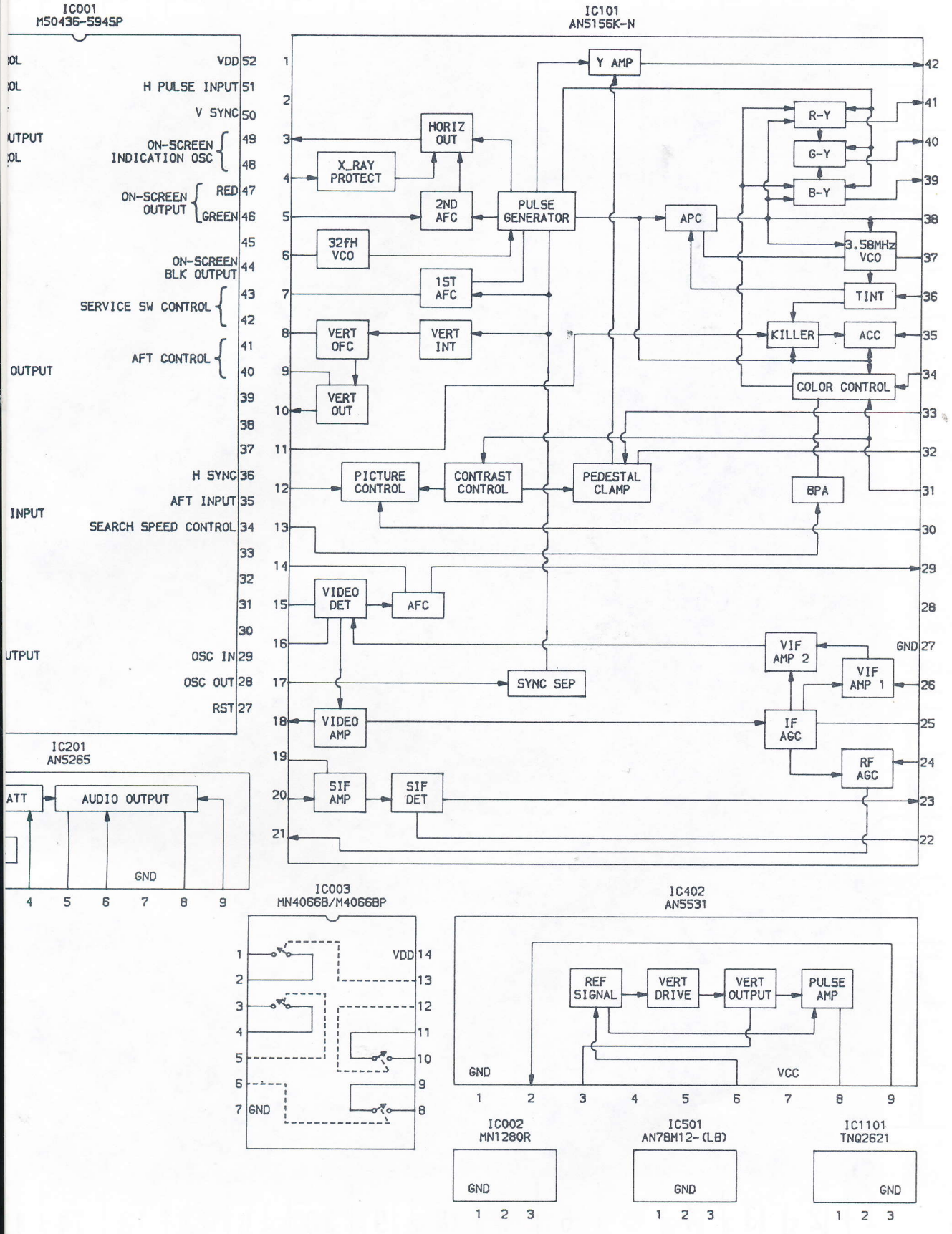
Value in ( ) used in some versions.

Measurements with switching as shown, unless noted.



T502
BOTTOM VIEW

IC FUNCTIONS



MISCELLANEOUS ADJUSTMENTS

Channel Pretuning

AUTO SEARCH MODE - Set will tune to any channel broadcasting a signal.

MEMORY MODE - Set will tune only to channels programmed into memory.

MODE SELECTION:

1. Momentarily Depress Power button to apply power to set.
2. Open slide cover on remote transmitter, for access to A and B buttons.
3. Depress and hold button A for 2 seconds. If Memory has been programmed, channel indicator display will flash twice, dot display will disappear and channel indicator bar will be yellow to indicate Memory Mode. Note: Memory must be programmed for memory mode use. See Memory Programming Instructions.
4. Depress and hold button A again for 2 seconds, to enter Auto Search Mode. Channel display will flash twice and dot display will appear to indicate Auto Search Mode.

AUTO SEARCH MODE

1. With power applied to set, select UHF or VHF.
2. Select AUTO SEARCH mode as described above.
3. Momentarily depress CHANNEL UP or DOWN button. A tuning scale will be displayed with a dotted line and a tuning bar. NOTE: Doted line indicates AUTO SEARCH mode, red bar indicates channel NOT programmed into memory, yellow bar indicates channel programmed into memory. U or V in front of scale indicates band.
4. Set SEARCH Switch (on rear control panel) to FAST (to receive only normal or strong signals), or SLOW (to receive weak signals).

Memory Programming

1. With power applied to set, select AUTO SEARCH mode as described in MODE SELECTION instructions.
2. Select UHF or VHF band.
3. Using CHANNEL UP or DOWN button on remote transmitter, select channel to be added to memory or erased from memory. NOTE: Momentarily depressing button B will add channels which are NOT in memory or erase channels which are in memory. Red tuning bar indicates channel not in memory, yellow bar indicates channel in memory.
4. Momentarily depress button B to add or erase channel. Dotted line and tuning bar color will change accordingly to indicate channel added or erased.
5. Repeat steps 2, 3 and 4 for each channel to be programmed.

NOTES:

1. All programming must be accomplished while on screen display is shown.
2. Memory can only be programmed while tuner is in AUTO SEARCH mode.
3. If memory has not been programmed, set can NOT be changed to MEMORY MODE. If only one channel has been programmed, MEMORY MODE will not change channels.

B+ CHECK

Connect a voltmeter to TP93, low side to ground. Set Brightness, Picture, and Color Controls to MINIMUM. With AC Line Voltage at 120VAC B+ should read 114.5VDC ±1VDC.

HIGH VOLTAGE CHECK

NOTE: B+ adjustment should be performed first. Tune in a picture. Connect a high voltage probe to CRT anode. High voltage should be 22.5KV ±1kV.

RF AGC ADJUSTMENT

Tune in a picture. Rotate RF AGC Control (R110) clockwise until snow appears in picture, then counterclockwise to a point just past where snow disappears.

SUB BRIGHTNESS ADJUSTMENT

NOTE: This adjustment must be done after color temperature and Sub Contrast adjustments are completed. Tune in a picture. Set Brightness, Color, and Picture Controls to MINIMUM. Adjust Sub Brightness Control (R313) (ABL) to where highlights are just visible. Set Brightness and Picture Controls to Maximum. Check for blooming on all channels, readjust Sub Brightness as required for minimal blooming.

SUB CONTRAST ADJUSTMENT

See Sub Brightness adjustment. Tune in a color bar pattern. Set customer controls for normal picture. Connect an oscilloscope to A2 (on A board), low side to CRT board ground. Adjust Sub Contrast Control (R305) for 1.75V p-p level of video component of waveform.

HORIZONTAL HOLD ADJUSTMENT

Tune in a picture. Rotate Horizontal Hold control (R504) fully clockwise, then counterclockwise until picture locks in with no jitter of tearing. Check all channels for proper operation, readjust as required.

CHANNEL NUMBER DISPLAY LOCATION ADJUSTMENT

Tune in a picture. Press and hold recall button on remote transmitter. Adjust R030 to center channel number display on the screen.

TUNING DISPLAY INDICATOR ADJUSTMENT

NOTE: Switches SW017, SW013, SW015 adjust position. Switches SW010, SW012, SW014 adjust width of range. Press and hold recall button on remote transmitter throughout this adjustment.

MISCELLANEOUS ADJUSTMENTS (CONTINUED)

VHF low (channels 2 - 6)
Tune in channel 2 (or closest station). Set SW017 to center the tuning indicator under the channel number selected.

Tune in channel 6 (or closest station). Set SW010 to center the tuning indicator under the channel number selected.

VHF high band (channels 7 - 13)
Tune in channel 7 (or closest station). Set SW013 to center the tuning indicator under the channel number selected.

Tune in channel 13 (or closest station). Set SW012 to center the tuning indicator under the channel number selected.

UHF (channels 14 - 69)
Tune in channel 14 (or closest station). Set SW015 to center the tuning indicator under the channel number selected.

Tune in channel 69 (or closest station). Set SW014 to center the tuning indicator under the channel number selected.

COLOR TEMPERATURE ADJUSTMENT (B/W TRACKING)

See Sub Brightness Adjustment. Tune in a black and white picture. Set Color, Brightness, and Picture Controls to MINIMUM. Set Red (R353), and Blue (R351) cutoff Controls to MINIMUM. Set Screen Control to MINIMUM. Set Service Switch to service position. Connect a digital DC voltmeter to TP47G, and CRT board ground. Rotate Brightness Control to Maximum. Adjust R316 (ABL) for 105VDC ±1VDC. Slowly advance screen control to obtain a dim horizontal green line. Adjust cutoff controls to obtain a dim white line. Place Service Switch to normal. Adjust the Blue (R356) and Red (R357) Drive Controls for best Black and White picture. Check tracking at low and high brightness. If necessary, readjust Controls slightly.

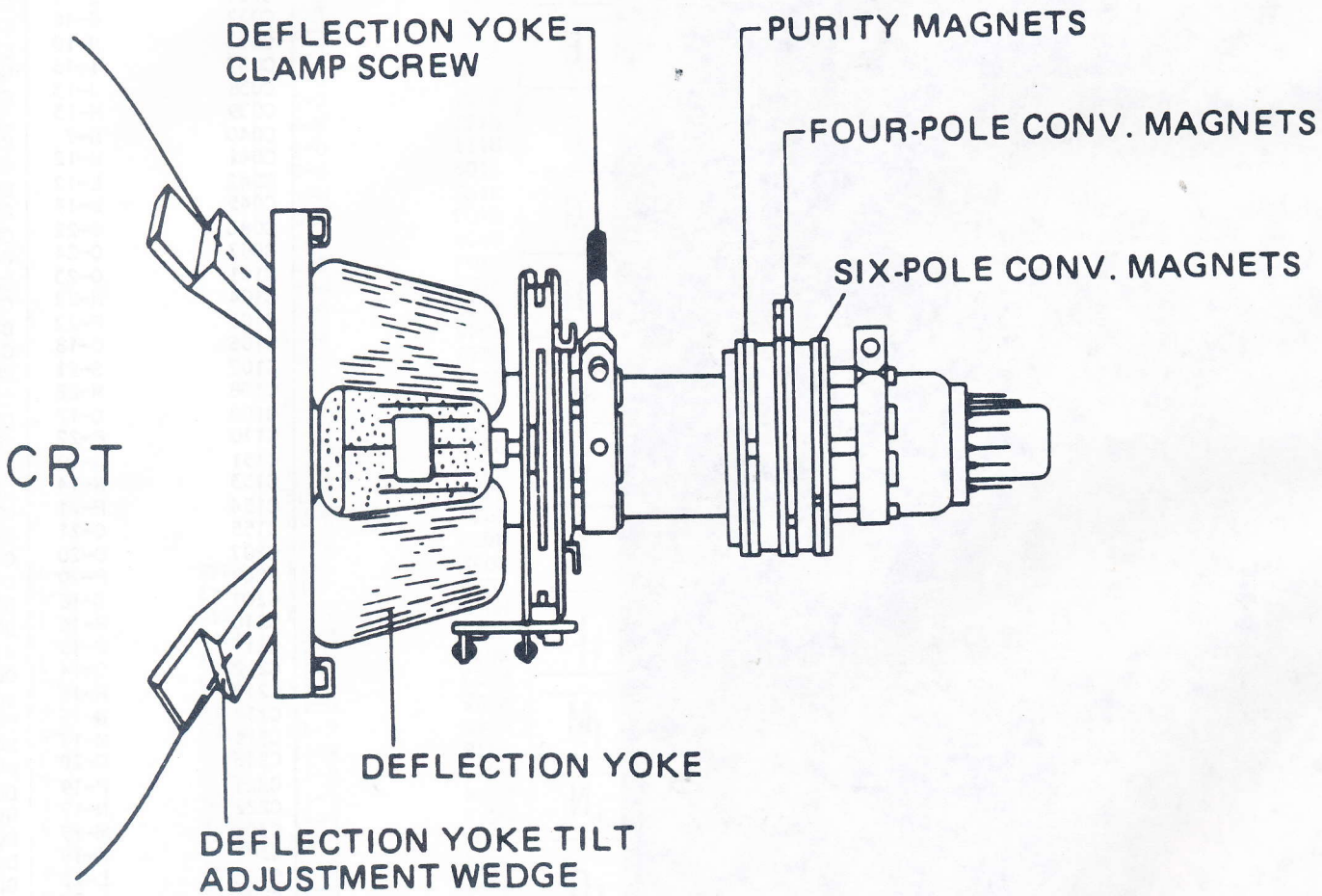
COLOR PURITY ADJUSTMENT

NOTE: Before attempting purity adjustments the receiver should be operated for 15 minutes with Brightness Control at Maximum.

Use a degaussing coil to demagnetize the CRT. Short TP14 to ground. Set Brightness Control to midrange. Adjust Red (R353) and Blue (R351) Cutoff Controls to obtain a green raster (MINIMUM). Loosen the yoke clamp screw and slide the yoke backward to obtain a vertical green band. Rotate and spread the purity magnet tabs until the green band is centered on the screen. Move the yoke forward until a uniform green screen is obtained. Check red and blue purity by adjusting respective cutoff controls.

CONVERGENCE ADJUSTMENTS

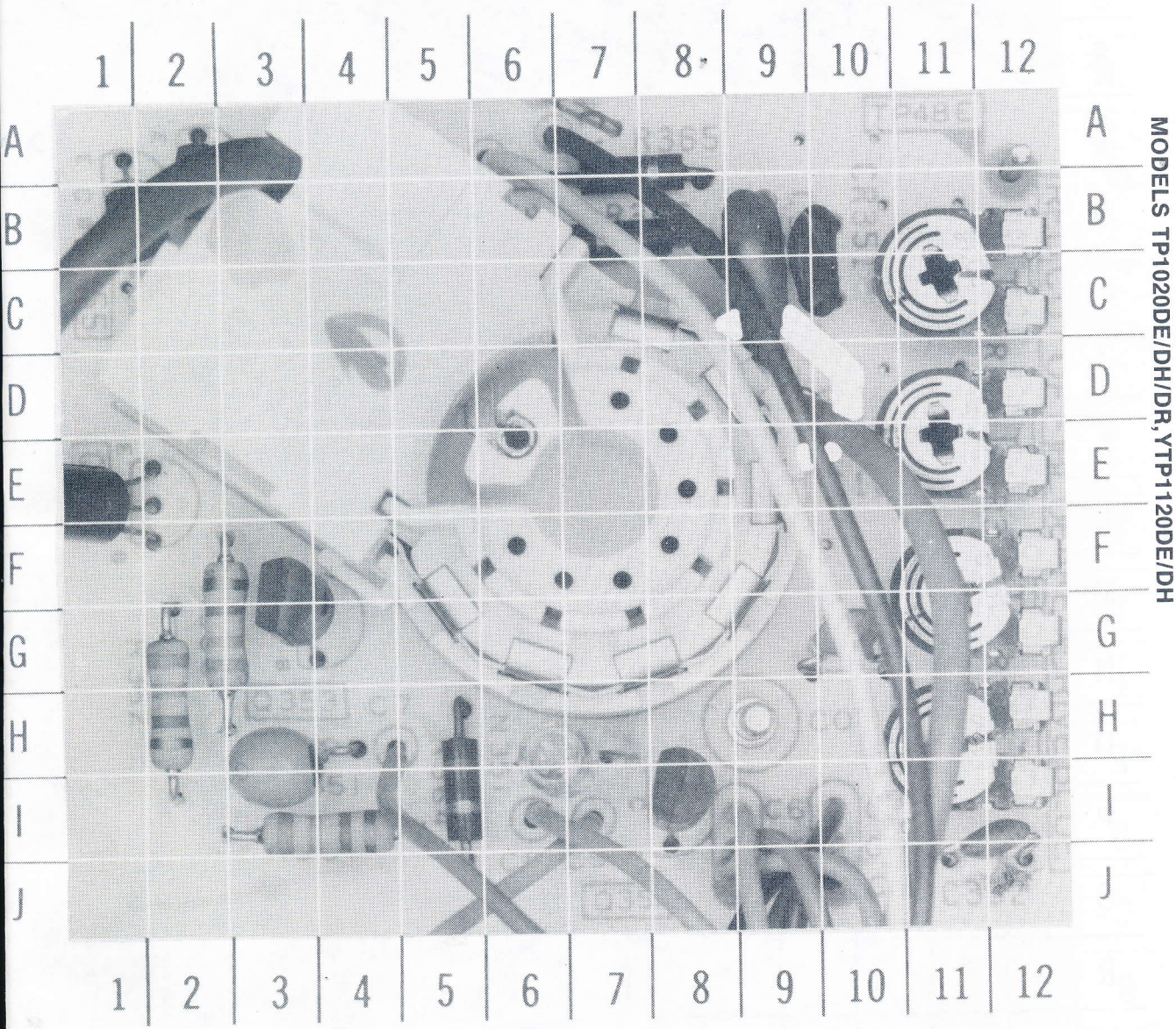
NOTE: Before attempting convergence adjustments the receiver should be operated for 15 minutes. Adjust Focus and Vertical Size. Connect a color bar generator to the antenna terminals and tune in a dot pattern. Adjust the tabs of the 4-pole magnets to converge the red and blue dots at the center of the screen. Adjust the tabs of the 6-pole magnets to converge the red, blue dots over the green dots at the center of the screen. NOTE: Rotate the two tabs of each set of magnets equally and opposite to converge vertically and rotate both tabs in the same direction to converge horizontally. 4 and 6 pole magnets interact, repeat adjustment until center convergence is correct. Tune in a crosshatch pattern and remove the rubber wedges between the yoke and the CRT. Tilt the yoke up or down to converge the vertical lines at top and bottom of screen and the horizontal lines at the left and right sides. Tilt the yoke right or left to converge horizontal lines at top and bottom of screen and the vertical lines at the left and right sides. Repeat convergence procedure if necessary to obtain best overall convergence. Apply adhesive to wedges and carefully replace on CRT. If misconvergence is still present on circumference of screen repeat procedure.



CRT NECK ASSEMBLY

CRT BOARD-GridTrace LOCATION GUIDE

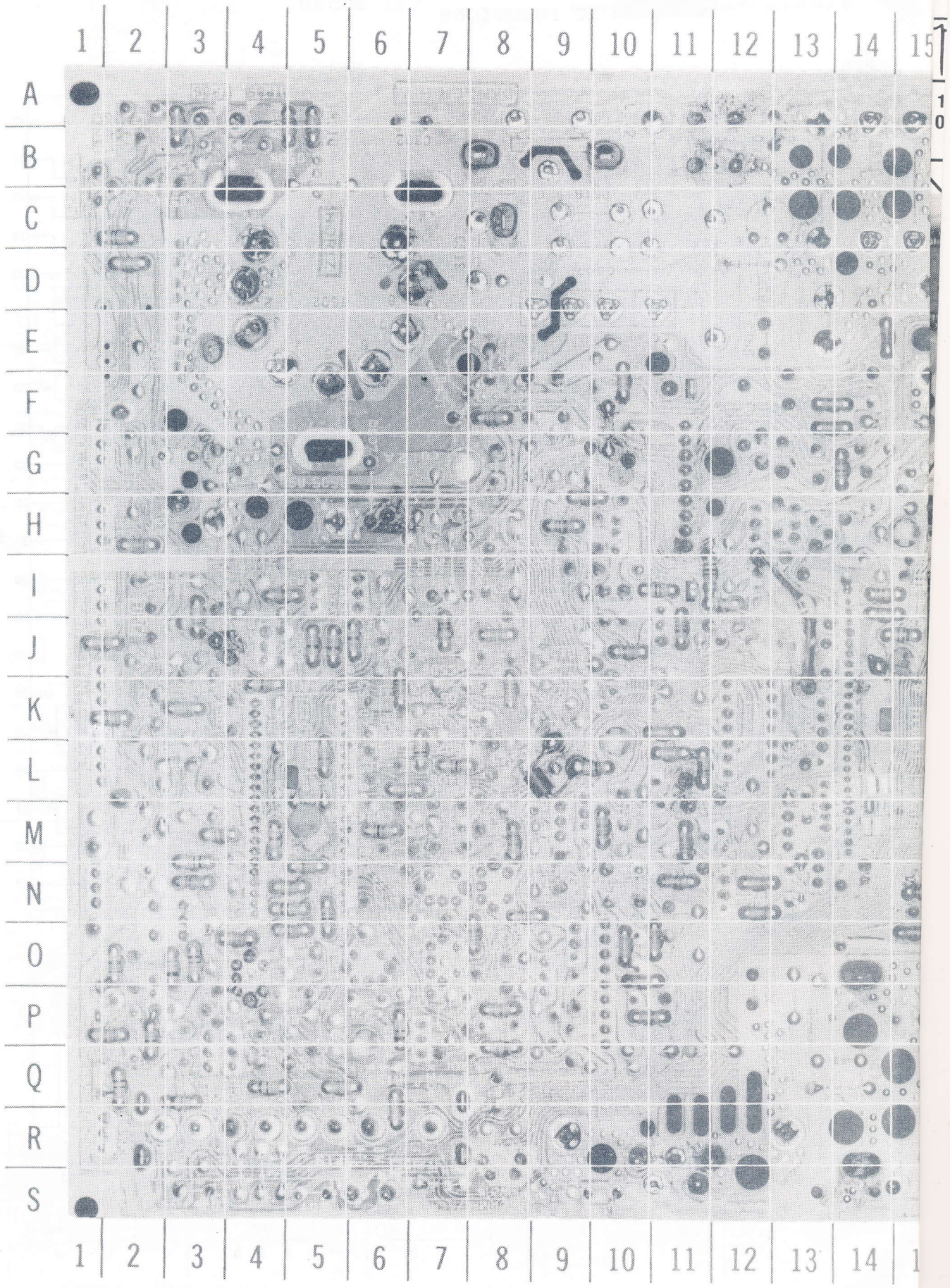
C351	G-10	Q351	I-8	R352*	F-9	R357	G-1	R363	G-2
C352	I-12	Q352	E-1	R353	C-11	R358*	B-3	R364	I-5
C353	B-9	Q353	F-3	R354*	D-12	R360*	B-12	R365	A-8
CR351	B-10	Q354	B-2	R355*	A-11	R361	I-4	R366	B-7
L351	H-3	Q355	A-2	R356	H-11	R362	H-2	R367*	B-2
N351	H-6	R351	E-11					*Located on bottom of board.	



QUASAR
MODELS TP1020DE/DH/DR,YTP1120DE/DH

A Howard W. Sams GRIDTRACE™ Photo

CRT BOARD

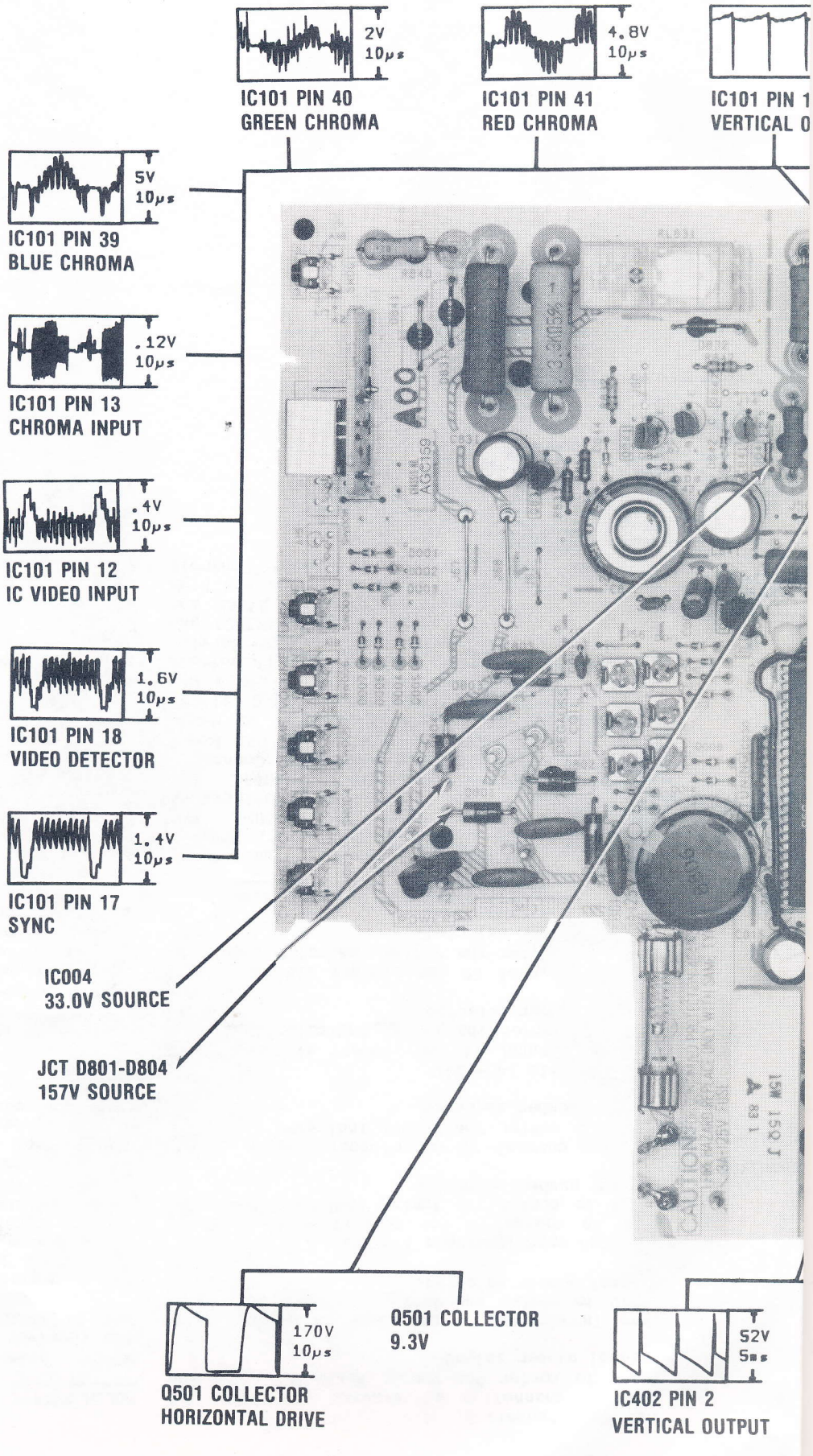


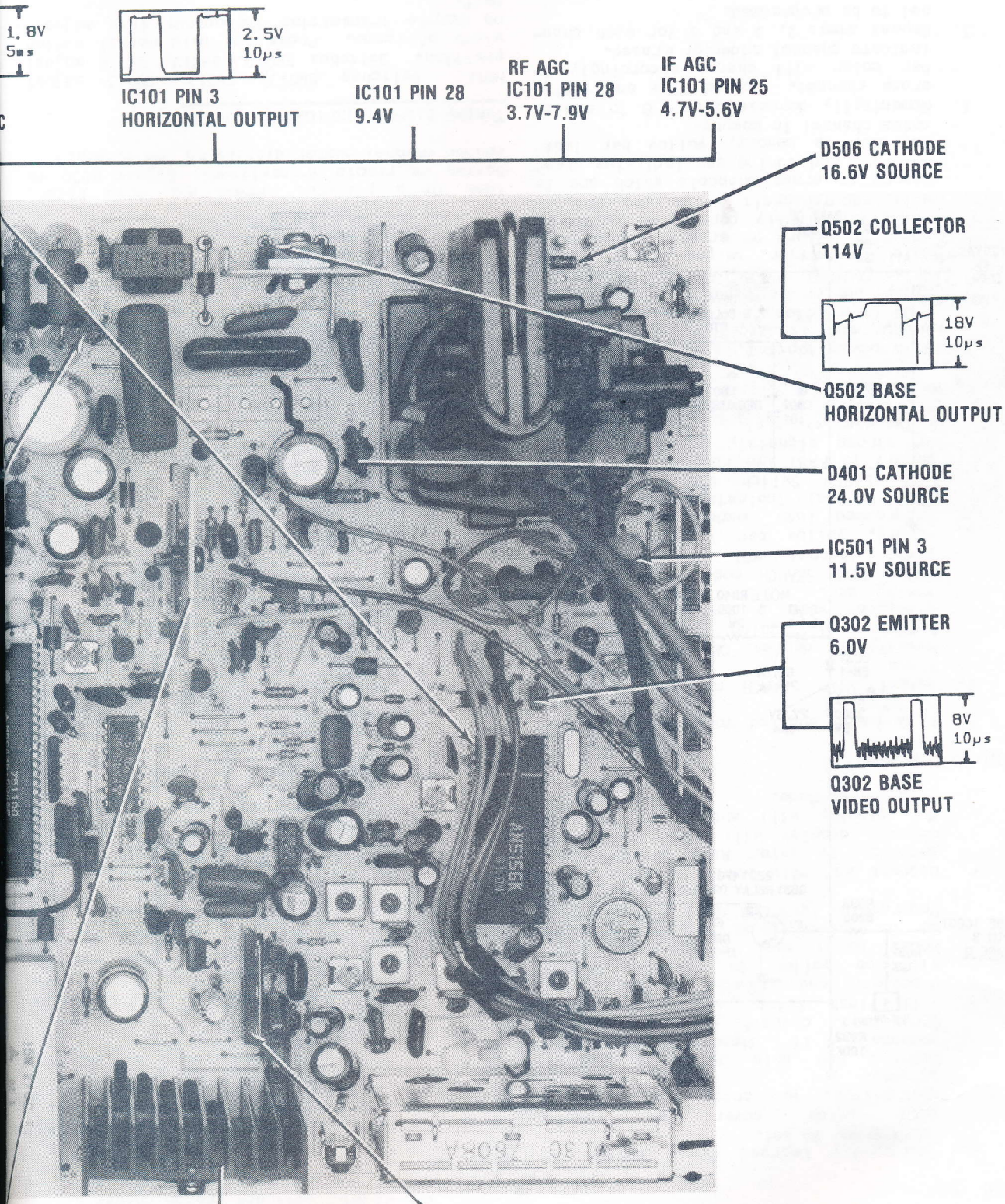
A Howard W. Sams GRIDTRACE™ Photo

MAIN BOARD (BOTTOM VIE

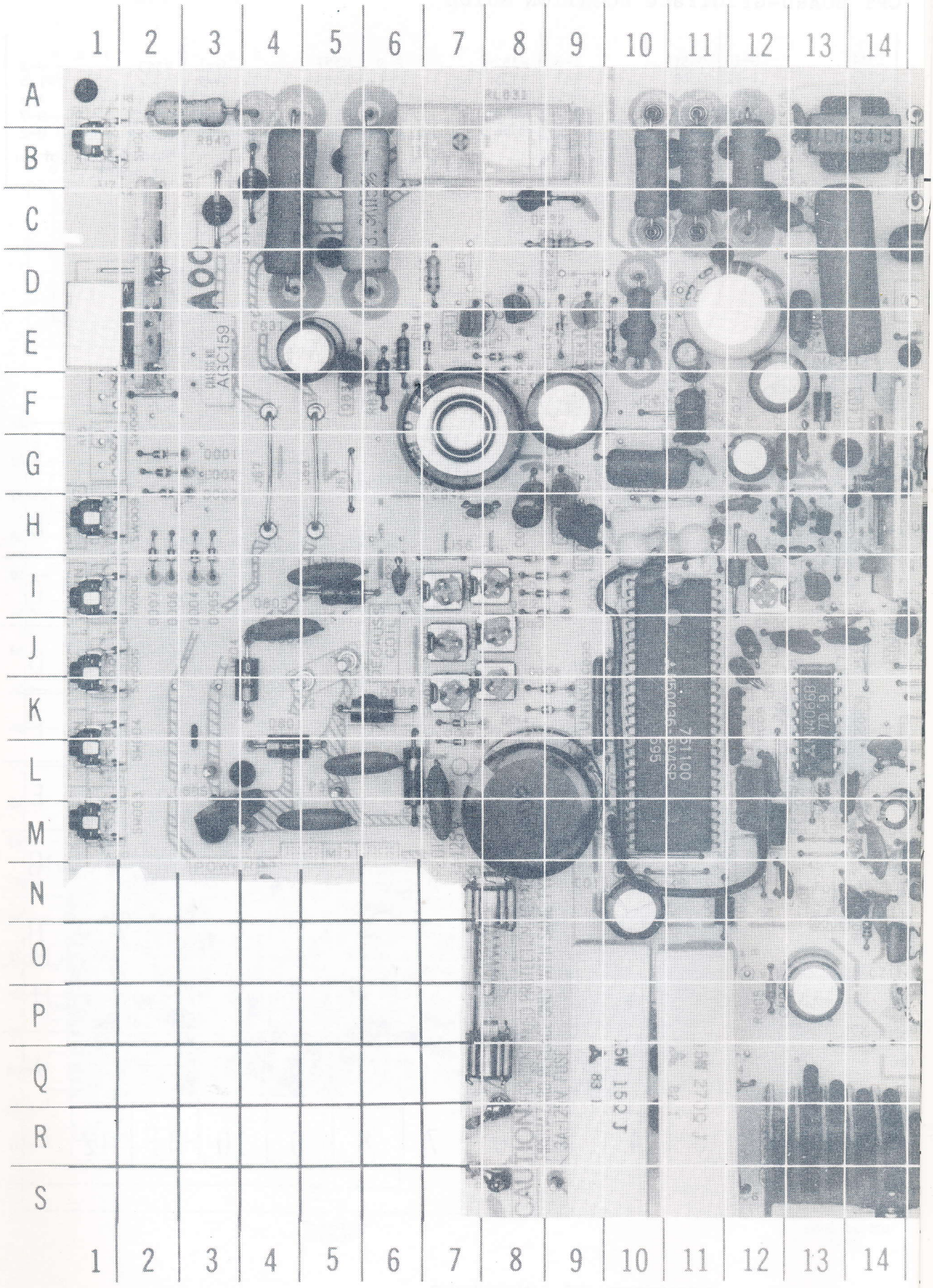
MAIN BOARD-GridTrace
LOCATION GUIDE (BOTTOM VIEW)

C024	I-11	R318	F-8
C025	I-11	R320	L-9
C034	J-15	R401	Q-8
C035	J-15	Q402	P-8
C036	N-15	Q406	L-6
C088	Q-4	R408	F-13
C089	Q-2	R409	F-13
C102	O-3	R412	F-10
C103	M-3	R413	G-14
C204	P-6	R414	C-2
C206	N-5	R501	L-5
C415	M-5	R502	L-7
D019	I-13	R508	E-14
L503	L-9	R510	J-8
R002	H-16	R512	K-6
R003	G-15	R513	I-7
R004	G-16	R514	L-7
R005	H-15	R515	K-8
R007	G-19	R602	M-6
R008	G-18	R604	K-2
R013	L-11	R606	K-3
R014	L-11	R608	J-1
R015	K-11	R609	I-4
R016	N-12	R612	J-5
R018	O-15	R613	J-5
R022	N-11	R614	J-6
R023	N-12	R843	F-17
R025	M-11	R844	F-18
R026	H-9	R845	G-17
R028	I-12	R846	F-17
R029	J-11	R847	E-18
R032	I-14	R848	E-17
R033	F-23		
R034	G-22		
R035	H-22		
R036	I-14		
R037	G-19		
R038	H-19		
R041	F-19		
R042	J-10		
R043	H-9		
R045	F-23		
R101	Q-3		
R102	P-2		
R104	O-3		
R105	N-3		
R106	N-5		
R108	M-5		
R109	P-2		
R111	O-2		
R152	R-6		
R153	Q-5		
R202	O-4		
R203	O-5		
R204	N-5		
R205	N-5		
R206	P-10		
R207	O-10		
R208	O-10		
R209	O-11		
R301	M-10		
R302	N-8		
R303	M-8		
R304	O-8		
R306	M-3		
R307	M-4		
R309	A-4		
R310	A-5		
R311	A-3		
R312	D-2		
R315	H-2		
R316	K-4		
R317	I-4		


2V
10μs
IC101 PIN 40
GREEN CHROMA
4.8V
10μs
IC101 PIN 41
RED CHROMA
IC101 PIN 1
VERTICAL O
5V
10μs
IC101 PIN 39
BLUE CHROMA
.12V
10μs
IC101 PIN 13
CHROMA INPUT
.4V
10μs
IC101 PIN 12
IC VIDEO INPUT
1.6V
10μs
IC101 PIN 18
VIDEO DETECTOR
1.4V
10μs
IC101 PIN 17
SYNC
IC004
33.0V SOURCE
JCT D801-D804
157V SOURCE
170V
10μs
Q501 COLLECTOR
HORIZONTAL DRIVE
Q501 COLLECTOR
9.3V
52V
5ms
IC402 PIN 2
VERTICAL OUTPUT


1.8V
5ms
2.5V
10μs
IC101 PIN 3
HORIZONTAL OUTPUT
IC101 PIN 28
9.4V
RF AGC
IC101 PIN 28
3.7V-7.9V
IF AGC
IC101 PIN 25
4.7V-5.6V
D506 CATHODE
16.6V SOURCE
Q502 COLLECTOR
114V
18V
10μs
Q502 BASE
HORIZONTAL OUTPUT
D401 CATHODE
24.0V SOURCE
IC501 PIN 3
11.5V SOURCE
Q302 EMITTER
6.0V
8V
10μs
Q302 BASE
VIDEO OUTPUT
IC402 PIN 7
11.5V
IC801 PIN 4
115V SOURCE
IC201 PIN 1
AUDIO OUTPUT
11.5V
IC201 PIN 8
AUDIO OUTPUT
6.6V

MAIN BOARD



A Howard W. Sams GRIDTRACE™ Photo

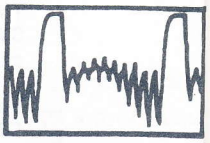
MAIN BOARD

MAIN BOARD-GridTrace

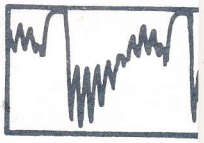
C002	G-10	C503
C005	H-8	C504
C008	N-12	C505
C009	N-15	C506
C010	M-14	C507
C014	H-13	C508
C015	N-10	C510
C016	I-12	C511
C020	M-14	C514
C022	I-6	C516
C023	I-15	C518
C026	H-16	C519
C027	I-10	C520
C030	J-9	C521
C031	L-12	C601
C032	G-16	C603
C033	H-10	C604
C037	I-16	C605
C038	J-13	C606
C039	H-13	C607
C040	H-7	C608
C041	H-12	C609
C042	L-12	C801
C045	L-14	C802
C086	S-22	C803
C087	Q-24	C805
C101	O-23	C806
C104	N-22	C807
C105	P-22	C808
C106	O-18	C831
C107	S-21	C841
C108	M-22	C842
C109	Q-17	CO-1A
C110	P-22	CR001
C151	N-19	CR002
C153	N-14	CR003
C154	P-21	CR004
C155	Q-21	CR005
C207	O-20	CR201
C208	P-20	CR601
C209	Q-16	D001
C210	P-16	D002
C211	P-15	D003
C212	O-14	D004
C213	N-15	D005
C214	N-16	D006
C215	M-17	D007
C216	O-20	D008
C221	P-19	D009
C222	N-19	D010
C301	M-19	D011
C302	A-19	D012
C303	L-23	D013
C304	L-22	D014
C305	G-17	D015
C401	P-17	D016
C402	P-18	D017
C403	L-17	D018
C404	J-19	D101
C405	G-16	D301
C406	G-13	D302
C407	G-12	D303
C408	E-13	D401
C409	F-16	D403
C410	F-16	D501
C411	L-17	D504
C412	E-11	D505
C414	F-12	D506
C416	F-11	D507
C417	G-12	D508
C418	G-15	D801
C501	K-17	D802
C502	K-19	D803

LOCATION GUIDE (TOP VIEW)

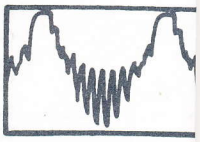
K-18	D804	K-4	R308	L-24
I-17	D805	M-3	R313	A-23
J-17	D806	S-11	R319	H-21
K-18	D831	B-4	R403	I-19
C-16	D832	C-8	R407	B-24
A-13	D841	C-3	R410	F-15
B-23	D842	E-9	R411	E-15
D-14	D843	F-7	R503	F-22
D-11	D844	E-7	R504	L-19
H-19	D849	E-8	R505	H-21
C-16	DY	D-17	R507	K-16
C-17	F801	O-8	R511	K-16
E-17	IC001	I-10	R518	B-10
I-18	IC002	M-12	R519	B-11
M-18	IC003	L-13	R520	B-12
M-18	IC004	E-10	R522	F-17
M-19	IC101	K-20	R610	J-23
K-23	IC201	P-15	R802	L-6
K-22	IC402	H-14	R804	Q-12
J-22	IC501	G-23	R805	P-12
I-22	IC801	S-14	R806	S-16
J-20	IC841	E-9	R807	Q-11
L-5	L001	L-15	R808	Q-9
J-4	L002	J-12	R831	C-5
I-5	L003	J-12	R832	D-7
M-8	L004	H-11	R833	F-6
P-13	L005	I-12	R840	A-3
M-5	L006	N-11	R841	C-4
L-7	L007	G-11	R842	C-9
E-4	L101	P-22	R851	E-5
F-9	L102	N-23	RL831	B-8
F-7	L103	P-16	SW1	B-1
M-16	L201	Q-18	SW3	M-1
J-13	L301	N-17	SW4	L-1
J-13	L501	I-18	SW5	J-1
I-15	L502	B-15	SW6	I-1
L-14	L601	L-18	SW9	H-1
H-9	N801	P-10	SW10	K-8
P-18	Q001	G-9	SW11	N-24
M-18	Q002	Q-22	SW12	J-8
G-2	Q003	Q-22	SW13	J-7
G-2	Q004	R-24	SW14	I-8
G-2	Q006	N-14	SW15	I-7
H-3	Q007	H-15	SW16	S-17
H-3	Q008	J-15	SW17	K-7
H-2	Q009	I-13	T101	O-18
H-2	Q010	H-13	T151	N-18
K-9	Q011	H-12	T201	O-19
I-16	Q101	P-23	T202	O-21
I-8	Q301	O-16	T501	B-14
I-8	Q302	J-21	T502	C-21
I-8	Q303	M-25	TP1	P-22
I-8	Q501	C-13	TP12	P-16
K-9	Q502	B-16	TP14	N-21
K-7	Q831	E-5	TP93	S-11
L-7	Q841	E-7	TPA2	I-20
M-15	Q842	D-8	X001	N-12
G-10	R009	L-12	X101	N-22
P-23	R010	J-16	X102	O-16
H-21	R012	L-14	X201	P-19
I-21	R017	G-16	X601	K-22
E-23	R030	I-12		
E-18	R039	O-14		
F-13	R040	J-16		
K-16	R044	G-15		
I-18	R089	E-10		
J-18	R103	P-23		
B-21	R107	P-16		
G-19	R110	P-24		
K-18	R112	P-21		
L-4	R151	O-17		
K-6	R210	H-17		
I-5	R305	O-17		



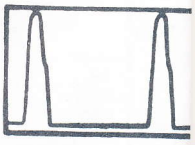
V1 PIN 9
GREEN OUTPU



V1 PIN 7
RED OUTPUT



V1 PIN 3
BLUE OUTPU



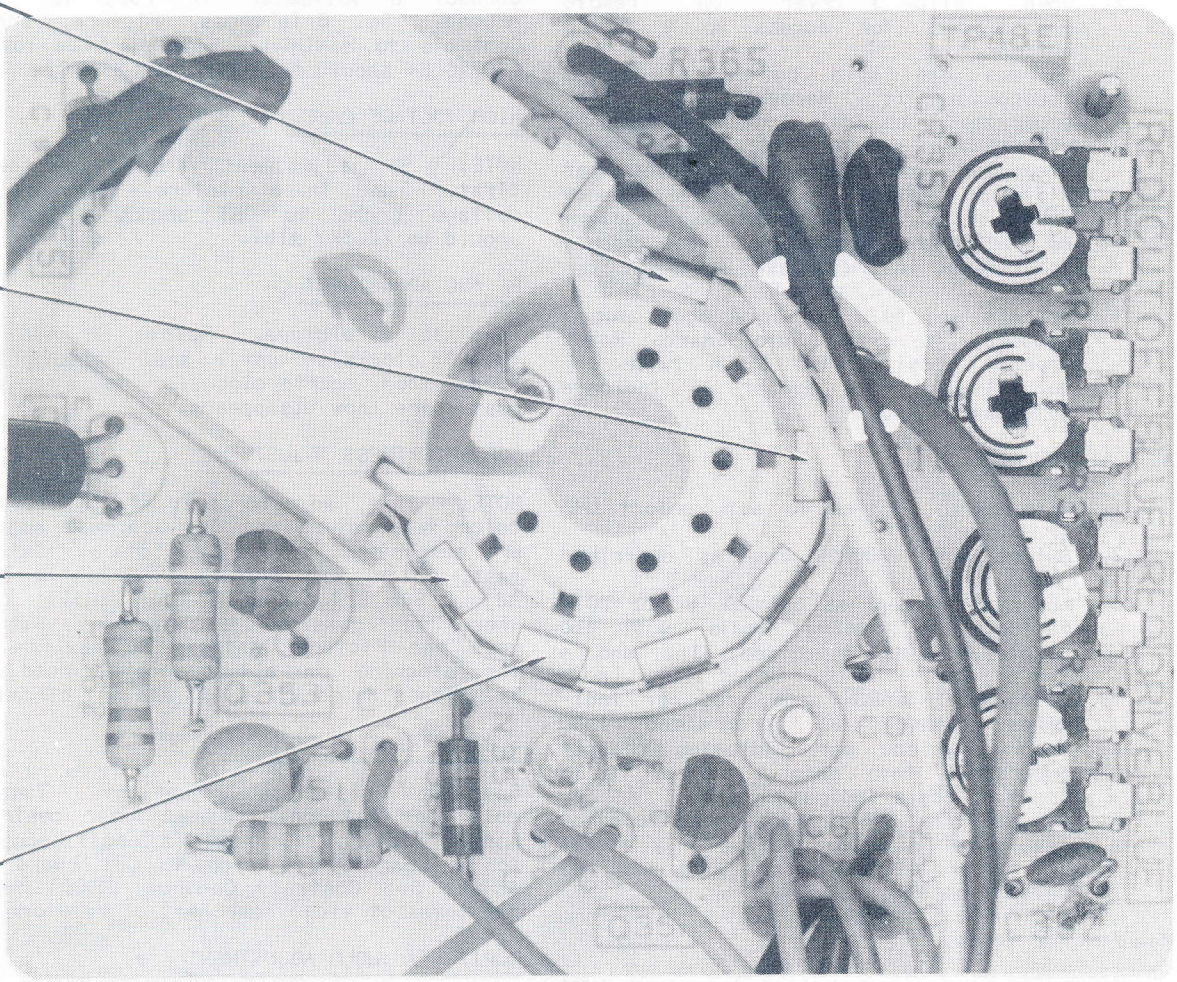
V1 PIN 4
FILAMENT

T
0V
0μs

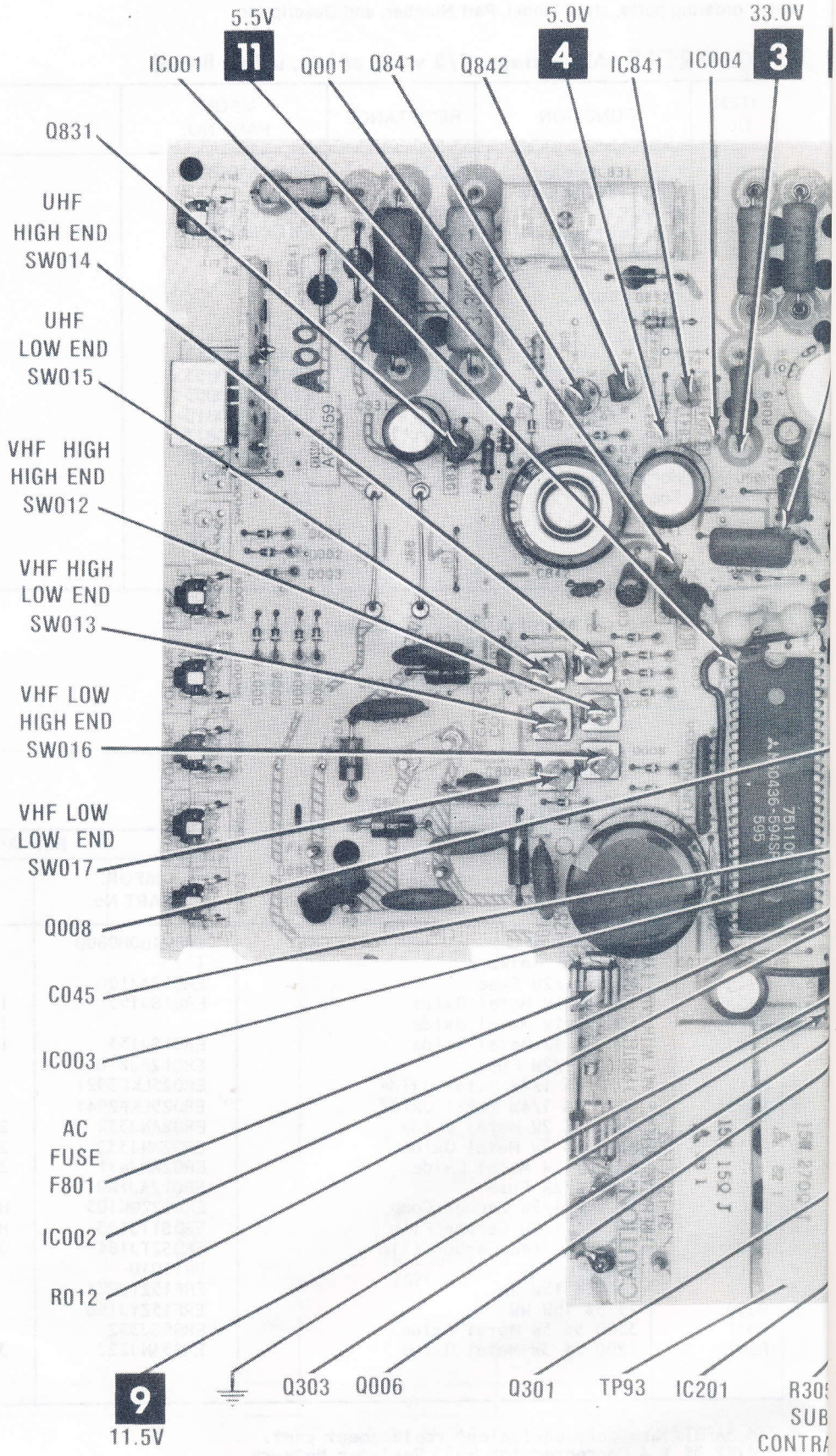
T
80V
10μs

T
80V
10μs

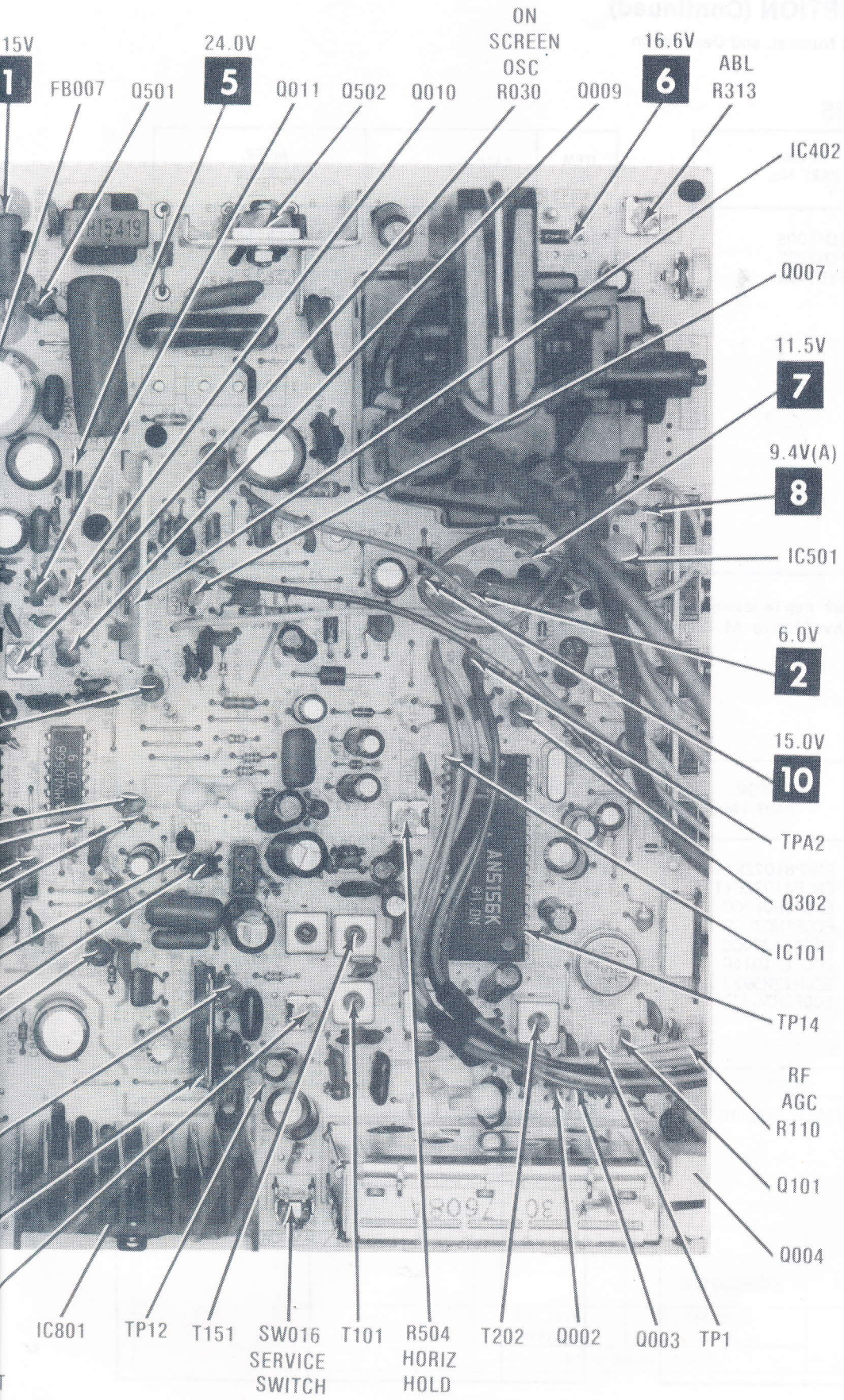
T
24V
10μs



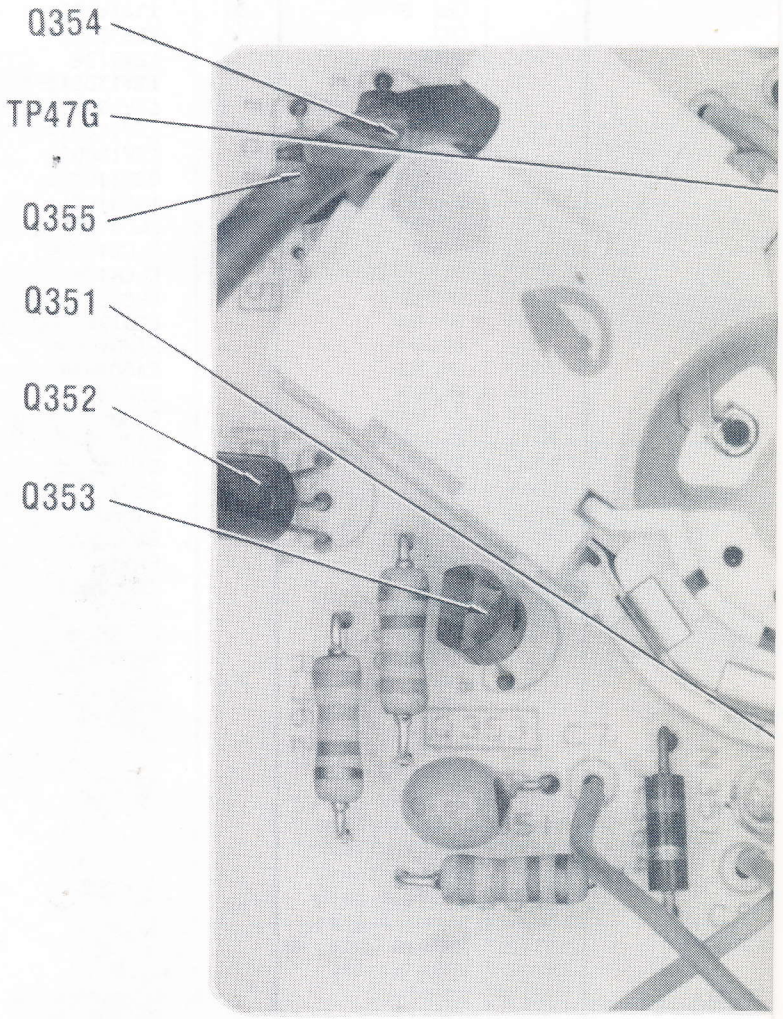
CRT BOARD



NOTE: ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED.


15V
1
FB007
Q501
24.0V
5
Q011
Q502
Q010
ON
SCREEN
OSC
R030
Q009
16.6V
6
ABL
R313
IC402
Q007
11.5V
7
9.4V(A)
8
IC501
6.0V
2
15.0V
10
TPA2
Q302
IC101
TP14
RF
AGC
R110
Q101
Q004
IC801
TP12
T151
SW016
SERVICE
SWITCH
T101
R504
HORIZ
HOLD
T202
Q002
Q003
TP1

MAIN BOARD



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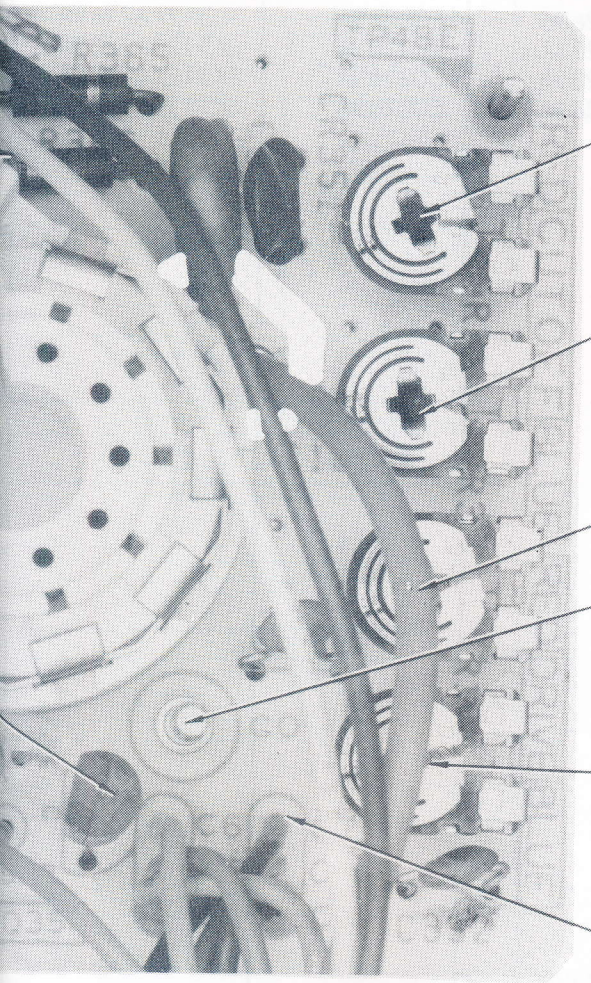
RED
CUTOFF
R353
BLUE
CUTOFF
R351
RED
DRIVE
R357
BLUE
DRIVE
R356
9.4V(B)
8

CRT BOARD

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.
D001 THRU D019	MA165	NTE519	ECG519	SK3100/519
D101	MA27T-A	NTE605A	ECG605A	SK7952/605A
	MA27TA	NTE605A	ECG605A	SK7952/605A
D220	MA165	NTE519	ECG519	SK3100/519
D301	MA150	NTE519	ECG519	SK3100/519
D302,3	MA165	NTE519	ECG519	SK3100/519
D401	RGP10J	NTE552	ECG552	SK9000/552
	TVSRGP10J	NTE552	ECG552	SK9000/552
D403	ERB12-02	NTE125	ECG125	SK3081/125
	TVSB1202	NTE116	ECG116	SK3311
D501	MA4047M	NTE5009A	ECG5009A	SK4A7/5009A
D504	RGP-10J	NTE552	ECG552	SK9000/552
	TVSRGP10J	NTE552	ECG552	SK9000/552
D505	RD12EBM	NTE5021A	ECG5021A	SK12A/5021A
	TVSRD12EBM	NTE5021A	ECG5021A	SK12A/5021A
D506,7	RGP10J	NTE552	ECG552	SK9000/552
	TVSRGP10J	NTE552	ECG552	SK9000/552
D508	MA4030M			
D801,2,3,4	RM11B	NTE125	ECG125	SK3081/125
	ERC0508	NTE125	ECG125	SK3081/125
	RM-11B	NTE125	ECG125	SK3081/125
D806	RPG10J	NTE552	ECG552	SK9000/552
	TVSRGP10J	NTE552	ECG552	SK9000/552
D808	TVS1N4148	NTE519	ECG519	SK3100/519
D831	EM-1	NTE116	ECG116	SK3313/116
	TVSEM1	NTE116	ECG116	SK3313/116
D832	AM01Z	NTE116	ECG116	SK3313/116
	TVSEM1	NTE116	ECG116	SK3313/116
D841	EM-1	NTE116	ECG116	SK3313/116
	TVSEM1	NTE116	ECG116	SK3313/116

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for bes

	NOTES
	#
	#
	#

PARTS LIST AND DESCRIP

When ordering parts, state Model, Part N

SEMICONDUCTORS (Sele

ITEM No.	MFGR. PART No./ TYPE No.
Q007,8,9	2SC1684R 2SC1684(Q) 2SC1684(R) 2SC1684QR
Q010,11	UN4213
Q101	2SC3315C
Q301	2SC1684R 2SC1684(Q) 2SC1684(R) 2SD636(Q) 2SD636(R) 2SC1684QR
Q302	2SA564R 2SA564(Q) 2SA564(R) 2SB641(Q) 2SB641(R) 2SA564QR
Q303	2SC1684R 2SC1684(Q) 2SC1684(R) 2SD636 2SC1684QR
Q351,2,3	2SC1473Q 2SC1473-QRNC 2SC1473NCQR
Q354,5	2SC1473Q 2SC1473QRNC 2SC1473NCQR
Q501	2SC1473AH
Q502	2SD1439Q 2SD1439-Q(LB)

st results)

G No.	TCE PART No.		NOTES
5A	SK7952/605A		
9	SK3100/519		
	SK9854		
66B	SK4066B		
66B	SK4066B		
5A			
5A			
			#
89			
			#
6	SK3592/966		
6	SK3592/966		
			#
9A	SK3124A/289A		
9A	SK3124A/289A		
9A	SK3124A/289A		
9A	SK3124A/289A		
56			
56			
56			
0A	SK3932/91		
0A	SK3932/91		
0A	SK3932/91		
0A	SK3932/91		

TION (Continued)

mber, and Description

t replacement for best results)

NTE PART No.	ECG PART No.	TCE PART No.		NOTES
NTE289A	ECG289A	SK3124A/289A		
NTE289A	ECG289A	SK3124A/289A		
NTE289A	ECG289A	SK3124A/289A		
NTE289A	ECG289A	SK3124A/289A		
NTE2359	ECG2359			
NTE289A	ECG289A	SK3124A/289A		
NTE289A	ECG289A	SK3124A/289A		
NTE289A	ECG289A	SK3124A/289A		
NTE16	ECG16	SK9664		
NTE16	ECG16	SK9664		
NTE289A	ECG289A	SK3124A/289A		
NTE290A	ECG290A	SK3932/91		
NTE290A	ECG290A	SK3932/91		
NTE290A	ECG290A	SK3932/91		
NTE19	ECG19	SK3912		
NTE19	ECG19	SK3912		
NTE290A	ECG290A	SK3932/91		
NTE289A	ECG289A	SK3124A/289A		
NTE289A	ECG289A	SK3124A/289A		
NTE289A	ECG289A	SK3124A/289A		
NTE16	ECG16	SK9664		
NTE289A	ECG289A	SK3124A/289A		
NTE399	ECG399	SK9352/399		
NTE399	ECG399	SK9352/399		
NTE399	ECG399	SK9352/399		
NTE399	ECG399	SK9352/399		
NTE399	ECG399	SK9352/399		
NTE399	ECG399	SK9352/399		
NTE399	ECG399	SK9352/399		
NTE2302	ECG2302	SK9422		#
NTE2302	ECG2302	SK9422		

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.
Q831	2SC1473Q	NTE399	ECG399	SK9352/399
	2SC1473QRNC	NTE399	ECG399	SK9352/399
	2SC1473NCQR	NTE399	ECG399	SK9352/399
Q841,2	2SC1684R	NTE289A	ECG289A	SK3124A/289A
	2SC1684(Q)	NTE289A	ECG289A	SK3124A/289A
	2SC1684(R)	NTE289A	ECG289A	SK3124A/289A
	2SC1684QR	NTE289A	ECG289A	SK3124A/289A

For SAFETY use only equivalent replacement part.

	NOTES

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C301	10 16V NP	ECEA1CN100S
C403	22 16V NP	ECEA1CN220S
C404	1 35V	ECSF1VE105K

	ITEM No.	RATING	MFGR. PART No.
	C411	2.2 35V	ECSF1VE225B
	C608	1 50V NP	ECEA1HN010S
#	C805	220 180V	ECES2PV221
#	C806	10 160V	ECEA2CS100

For SAFETY use only equivalent replacement part.
Items Not Listed Are Normally Available At Local Distributors.

CAPACITORS

	ITEM No.	RATING	MFGR. PART No.
	C30	CAP Network	EXFP8102ZF(1)
	C31	CAP Network	EXFP4102ZF(1)
	C106	1 NPO 50V ±.25	ECCF1H010CC
	C151	3 NPO 50V ±.25pF	ECCF1H030CC
	C221	3 NPO 50V ±.25pF	ECCF1H030CC
	C502	100 NPO 50V 5%	ECCF1H101JC
#	C507	.0039 1.2KV 5%	ECWH12H392JS
#	C511	.3 200V 5%	ECQF2H304JZ

	ITEM No.	RATING	MFGR. PART No.
#	C518	.0015 2KV 5%	ECKD3D152JC
#	C519	.0015 2KV 5%	ECKD3D152JB
	C606	9 NPO 50V ±.5pF	ECCF1H090DC
#	C801	.01 500V	ECKD2H103PU
#	C802	.01 500V	ECKD2H103PU
#	C803	.01 500V	ECKD2H103PU
#	C807	.01 500V	ECKD2H103PU
#	C808	.01 500V	ECKD2H103PU

For SAFETY use only equivalent replacement part.
Items Not Listed Are Normally Available At Local Distributors
(1) .01 50V

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

CONTROLS (All wattages 1/2 watt, or less, unless listed)

	ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
	R30	Channel Number Display Adjust	20K	EVND4AA00B24	
	R110	RF AGC	2000	EVN59UA00B23	
	R305	Sub Contrast	2000	EVND4AA00B23	
	R308	Color	10K	(1)	
		Tint	10K	(1)	
		Brightness	500	(1)	
		Picture	10K	(1)	
		V Hold	30K	(1)	
	R313	ABL	5000	EVND4AA00B53	
	R351	Blue Cut Off	5000	EVN61AA00B53	
	R353	Red Cut Off	5000	EVN61AA00B53	
	R356	Blue Drive	1000	EVN61AA00B13	
	R357	Red Drive	1000	EVN61AA00B13	
	R407	V Height (size)	200K	EVN59UA00B25	
	R504	Horizontal Hold	10K	EVND4AA00B14	
#	R599A	Focus		(2)	
#	R599B	Screen		(2)	
	R610	APC	10K	EVND4AA00B14	

For SAFETY use only equivalent replacement part.
(1) Part of Five Section Control Bracket
Part Number EVUG5ACA007
(2) Part of Horizontal Output Transformer Number T502
Part Number TLF14743F

RESISTORS (Power and Special)

	ITEM No.	RATING	REPLACEMENT DATA		
			MFGR. PART No.	NTE PART No.	
#	D805	7.8 Cold TPC	ERPZ4B0M080B		
	R009	Resistor Network	(1)		
#	R210	10 5% 1/2W Fuse	ERQ12AJ100		
#	R361	15K 5% 1W Metal Oxide	ERG1SJ153	1W315	
#	R362	15K 5% 1W Metal Oxide		1W315	
#	R363	15K 5% 1W Metal Oxide	ERG1SJ153	1W315	
	R503	27 5% 1/2W Fuse	ERQ12AJ270		
#	R512	3921 1% 1/4W Metal Oxide	ER025LKF3921		
#	R513	2950 1% 1/4W Metal Oxide	ER025LKF2941		
#	R518	3300 5% 2W Metal Oxide	ERG2ANJ332	2W233	
#	R519	3300 5% 2W Metal Oxide	ERG2ANJ332	2W233	
#	R520	470 5% 2W Metal Oxide	ERG2ANJ471	2W147	
#	R522	1 5% 1/2W Fuse	ERQ12AJ1R0		
#	R802	1M 10% 1/2W Carbon Comp	ERC12ZGK105	HW510	
#	R804	12K 5% 1/2W Carbon Film	ERDS1TJ123	HW312	
#	R805	180K 5% 1/4W Carbon Film	ERDS2TJ184	QW418	
#	R806	Fusible	UN11010		
#	R807	270 5% 15W WW	ERF15ZYJ271		
#	R808	15 5% 15W WW.	ERF15ZYJ150		
	R831	3300 5% 5W Metal Oxide	ERG5SJ332		
	R841	2200 5% 3W Metal Oxide	ERG3ANJ222	3W222	

For SAFETY use only equivalent replacement part.
(1) 47KV 5% X 4 Corrected for R003 Resistor Network.

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.
L001	RF Choke (100uH)	ELEPE101KA
L002	Peaking (15uH)	TLT150K106R
L003	Peaking (15uH)	TLT150K106R
L004	RF Choke (.27uH)	ELEPER27KA
L101	RF Choke (.56uH)	ELEQER56KA
L102	RF Choke (.68uH)	ELEQER68KA
L103	Peaking (15uH)	ELEPE150KA

ITEM No.	FUNCTION	MFGR. PART No.
L201	Peaking (15uH)	ELEPE150KA
L351	RF Choke (470uH)	TLT471K991R
L601	RF Choke (18uH)	ELEPE180KA
T101	Video Detector	EIV7EN059B
T151	AFC Filter	EIV7EN060B
T201	Sound IF	EIS7EN013B
T202	Sound Detector	EIS7EN008B

COILS & TRANSFORMERS

	ITEM No.	FUNCTION	MFGR. PART No.	OTHER IDENTIFICATION	NOTES
#	L503	Yoke: 90° Horiz 3.66mH Vert 22.5mH	TLY15395F1		
#	T203	Earphone Isolation	ETA16Z17AY	A1617 (1)	
	T501	Horiz Driver	TLH15419		
#	T502	Horiz Out	TLF14743F		

For SAFETY use only equivalent replacement part.
(1) Number on unit.

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

MISCELLANEOUS

	ITEM No.	PART NAME	MFGR. PART No.	NOTES
	CR001	Capristor	EXRP391K123S	
	CR002	Capristor	EXRP181K822S	
	CR003	Capristor	EXRP122K682S	
	CR004	Capristor	EXRP471K222S	
	CR005	Capristor	EXRP101K223S	
#	CR091	Capristor	EXNG102Z3650	
	CR092	Capristor	EXNG102Z3650	
	CR201	Capristor	EXPP820K333C	
	CR351	Capristor	EXRP331K471T	
	CR601	Capristor	EXRP180K332S	
#	F801	Fuse, AC	XBA1F30NU100	3 Amp @ 125VAC Slow Blow
	F801A	Fuse Holder	TJC6319	Two Used
	IC1101	Remote Receiver	TNQ2621	
	L005	Ferrite Bead	TSK1008	
	L006	Ferrite Bead	TSK1008	
	L007	Ferrite Bead	TSK1008	
	L301	Delay Line	EIK7EN002Q	
	L501	Ferrite Bead	TSK1008	
	L502	Ferrite Bead	TSK1008	
	L504	Ferrite Bead	TSK1008	
#	L802	Deguassing Coil	TLK159025M	
	N351	Lamp, Neon	XANT137	Spark Suppression, CRT Filament
#	N801	Lamp, Neon	XANT141	Spark Suppression, Power Supply
#	RL831	Relay	TSE1838	Power
	SW001	Switch	EVQQSN04T	Power
	SW003	Switch	EVQQSN04T	Channel UP
	SW004	Switch	EVQQSN04T	Channel Down
	SW005	Switch	EVQQSN04T	Volume Up
	SW006	Switch	EVQQSN04T	Volume Down
	SW009	Switch	EVQQSN04T	UHF/VHF
	SW010	Switch	EVND48A00	Adjustable, Range, VHF Low Band
	SW011	Switch	ESD142126	Search, Fast/Slow
	SW012	Switch	EVND48A00	Adjustable, Range, VHF High Band
	SW013	Switch	EVND48A00	Adjustable, Position, VHF High Band
	SW014	Switch	EVND48A00	Adjustable, Range, UHF Band
	SW015	Switch	EVND48A00	Adjustable, Positon UHF Band
	SW016	Switch	EVQQSN04T	Service
	SW017	Switch	EVND48A00	Adjustable Position, VHF Low Band
	SW091	Switch	ESD1512217	Antenna, Rod External
	X001	Crystal	EF0FC4194A4	Tuning Clock
	X101	Saw Filter	EFCH45MVK11T	
	X102	Trap	EFCS4R5MW3	4.5MHz
	X201	Filter	EFCS4R5MS4E	4.5MHz Bandpass
	X601	Crystal	TSS816E	3.58MHz Oscillator
		Antenna, UHF	0SA110021	
		Antenna, VHF	TSA120022	
			TSA120013-1	
			TSA120013-7	
			TSA120013-9	
		Cord	TSX3136	AC Power
		CRT	A26JGZ91X	
		CRT Socket	TJS1A5081	
		Magnet rings	TLC2042	Purity and Static Convergence
		PC Board (Complete)	TJB1723300M	Antenna Terminal.
		PC Board (Complete)	TJB1723312M	Antenna Terminal.
		Tuner	ENV76808F2	UHF/VHF

For SAFETY use only equivalent replacement part.

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
	2 5/8" X 3 3/8" Oval PM 16 Ohms	EAS65P34DG		

CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.	PART No.	PART No.	PART No.
MODEL	TP1020DE	TP1020DH	TP1020DR	YTP1120DE
Cabinet Back	TXFKU368SER	TXFKU378SER	TXFKU388SER	TXFKU398SER
MODEL	YTP1120DH			
Cabinet Back	TXFKU408SER			

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

REMOTE CONTROL TRANSMITTER PARTS LIST

ITEM	PART No.	PART No.	PART No.	PART No.
REMOTE CONTROL TRANSMITTER				
MODEL	TP1020DE	TP1020DH	TP1020DR	YTP1120DE
Remote Control Transmitter	EUR50257	EUR50258	EUR50510	EUR50257
Battery Cover	UR50EC782	UR50EC782A		UR50EC782
Upper Case	UR50VCS601	UR50VCS603		UR50VCS601
Bottom Case	UR50VCS621	UR50VCS622		UR50VCS601
MODEL	YTP1120DH			
Remote Control Transmitter	EUR505258			
Battery Cover	UR50EC782A			
Upper Case	UR50VCS603			
Bottom Case	UR50VCS622			